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United States
Department of
Agriculture

Forest Service

Tongass
National Forest

R10-MB-410

March 2000



Kuakan Timber Sale

Record of Decision and Final Environmental Impact Statement





United States
Department of
Agriculture

Forest
Service

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Date: March 28, 2000

Dear Reader:

Attached is the Record of Decision (ROD) and the Final Environmental Impact Statement for the Kuakan Timber Sale on the Tongass National Forest.

Additional copies of the Final EIS are available for review at Forest Service Offices in Wrangell and Petersburg. Copies have also been sent to libraries throughout Southeast Alaska.

The ROD documents my final decision on the selection of an alternative, and the factors considered in reaching the decision. The effective date of implementation for the decision and the Notice of Rights of Appeal are also specified in the ROD.

I want to thank those of you who took the time to review and comment on the Draft Environmental Impact Statement. Your interest in the management of the Tongass National Forest is appreciated.

As the Assistant Forest Supervisor, I am responsible for this decision. Please direct any correspondence or requests for additional copies to Randy Hojem, Kuakan Team Leader, P.O. Box 51, Wrangell, AK 99929; or to the e-mail address: rhojem@fs.fed.us.; or call (907) 874-2323.

Sincerely,

CAROL J. JORGENSEN
Assistant Forest Supervisor
Tongass National Forest

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Kuakan Timber Sale Record of Decision

Introduction

This Record of Decision (ROD) documents my decision to select an alternative from the Kuakan Timber Sale Final Environmental Impact Statement (Final EIS). This Decision includes the specific location and design of timber harvest units, protection requirements for harvesting timber, and associated facilities to be used. This Decision also makes a determination regarding a non-significant Forest Plan amendment, which would move the Deer Island Old-Growth Reserve. The Kuakan Project Area is located in Southeast Alaska on Deer Island, 35 miles south of the town of Wrangell, Alaska (see Figure 1-1 in the Final EIS). The project area is on the Wrangell Ranger District of the Tongass National Forest.

Background

The purpose and need for the proposed timber harvest is to respond to goals and objectives identified by the Forest Plan and to move the project area toward the desired future condition for all resources. The Forest Plan identified the following goals and objectives, which are applicable to the Kuakan Project Area:

- 1) manage the timber resource for production of saw timber and other wood products from suitable timber lands made available for timber harvest, on an even-flow, long-term sustained yield basis and in an economically efficient manner (Forest Plan, page 2-4).
- 2) seek to provide a timber supply sufficient to meet the annual market demand for Tongass National Forest timber, and the demand for the planning cycle (Forest Plan, page 2-4).
- 3) recognize the scenic values of suitable timber lands viewed from identified popular roads, trails, marine travel routes, recreation sites, bays, and anchorages, and modify timber harvest practices accordingly (Forest Plan, page 3-135).
- 4) maintain and promote industrial wood production from suitable timber lands, providing a continuous supply of wood to meet society's needs (Forest Plan, page 3-135 and 3-144).
- 5) provide a diversity of opportunities for resource uses that contribute to the local and regional economies of Southeast Alaska (Forest Plan, page 2-3).
- 6) support a wide range of natural-resource employment opportunities within Southeast Alaska communities (Forest Plan, page 2-3).

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- 7) maintain a Forest-wide system of old-growth forest habitat to sustain old-growth associated species, and ensure that the reserve system meets the minimum size, spacing and composition criteria in Appendix K (Forest Plan, page 2-2).

Public scoping began with the Notice of Intent to prepare an EIS published in the *Federal Register* on July 29, 1998. A Draft Environmental Impact Statement (Draft EIS) was distributed in June 1999 and the comment period lasted until the end of August 1999. This ROD and the Final EIS disclose the environmental effects of the alternatives considered and document my decision to authorize the project and associated activities.

In developing the Final EIS and this ROD, I recognize that less than complete knowledge exists about many relationships and conditions of wildlife, fish, forests, jobs, and communities. The ecology, inventory, and management of a large forest area is a complex and evolving science. The analysis of wildlife species prompts questions about population dynamics and habitat relationships. The interaction between resource supply, the economy, and communities is not an exact science.

The data and level of analysis used in the Final EIS were commensurate with the importance of the possible impacts (40 CFR Code of Federal Regulations (CFR) 1502.15). When encountering a gap in information, the interdisciplinary team (IDT) took one of two approaches: (1) they collected the missing information or conducted the analysis necessary to identify important relationships, or (2) they concluded that, although the missing information would have added precision to estimates or better specified a relationship, the basic data and central relationships are sufficiently established in the respective sciences so that new information would be very unlikely to reverse or nullify understood relationships. As such, information missing from the Final EIS was not determined to be essential for a reasoned choice among the alternatives.

Decision

This Record of Decision documents my decision to implement activities in the Kuakan Project Area. My decision encompasses the following:

- whether or not timber should be made available for harvest, and if so, how much;
- if timber is to be harvested, the location and design of timber harvest units;
- if roads are to be built, the location and design of road systems;
- if log transfer facilities are to be built, the location and design of those facilities;
- if roads are constructed or used, road management objectives including closures for resource protection and economics;
- standards and guidelines, mitigation measures, and enhancement opportunities for resources other than timber;
- whether there may be a significant restriction on subsistence use and if so, related findings and measures to minimize impacts on subsistence users; and
- the approval of a non-significant Forest Plan amendment moving the small old-growth reserve from the west side of Deer Island to the north end of the island.

It is my decision to choose Alternative 5 from the Final EIS as the Selected Alternative for implementation in the Kuakan project area.

This decision:

- meets the purpose and need for the project;
- is consistent with the April 1999 Tongass National Forest Land and Resource Management Plan Record of Decision;
- and is responsive to issues raised during scoping, to information gathered during the environmental analysis, and public and agency comments on the Draft EIS.

Specifically, I select **Alternative 5** and authorize the required actions to implement this decision.

Description of the Selected Alternative:

- 1) The Selected Alternative will harvest timber from approximately 1,350 acres in the project area. This harvest will provide approximately 12 million board feet of sawlog and utility volume. Design features of the 7 selected harvest units are described in detail on the unit cards in Appendix 1 attached to this Record of Decision.
- 2) The Selected Alternative includes partial harvest techniques on all units, retaining 65%-75% of the volume within the stands, using helicopter-logging systems. All units incorporate uneven-aged management through individual tree harvest. Trees to be harvested will be designated by description in the timber sale contract. The actual diameter sizes for trees to be cut will be determined based on information collected during the timber sale layout and cruise.
- 3) The Selected Alternative includes no road construction. No roads have been constructed on Deer Island, and the island will remain unroaded.
- 4) The existing Deer Island West Log Transfer Facility (LTF) will be approved for reconstruction and could be used to transfer logs directly to barges or into the water for rafting. The original permits for use of this LTF have expired, and we have applied to the Corps of Engineers and Alaska DNR to have permits re-issued. The LTF will be reconstructed within the existing footprint, using a rock-faced bulkhead for barge access. If the West LTF is used, it will be restored to its current reclaimed condition at closure of the sale.
- 5) There will be no land-based logging camps within the Project Area. The timber purchaser will likely locate a floating camp either in the Southwest Cove of Deer Island near the Deer Island West LTF, or in Frosty Bay. Both of these sites have been used previously for floating camps, and the operator of the camp will be responsible for securing appropriate permits from state and federal agencies.

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- 6) This Record of Decision identifies mitigation measures to reduce or eliminate adverse environmental effects of timber harvest specified in the Selected Alternative. It also specifies the implementation and effectiveness monitoring planned to determine how well resource management objectives have been met. In addition, Appendix C of the FEIS identifies feasible enhancement opportunities following implementation of this alternative. These opportunities will be included in the Sale Area Improvement Plan developed for the timber sale.
- 7) I have determined that the effects of the Selected Alternative on the subsistence use of resources in the Project Area are minimal. The direct effects from the action alternatives in the Kuakan Project Area do not present a significant possibility of a significant restriction of subsistence uses of wildlife, fish and shellfish, marine mammals, other foods, and timber resources. The potential foreseeable and cumulative effects from implementing the TLMP through the entire rotation period, including the no-action and action alternatives in the Project Area, do not present a significant possibility of a significant restriction of subsistence uses of deer, bear, marten, wolf and other resources.
- 8) Finally, my decision incorporates a non-significant amendment to the Forest Plan by adjusting the Kuakan Small Old Growth Reserve as shown on the Record of Decision Map (ROD page 21) and documented in Appendix 2, attached to this Record of Decision.

Reasons for the Decision

- 1) In making my decision, I considered all issues that were raised during the development and public involvement of this project. I also considered Forest Plan and Record of Decision standards and guidance for the project area, and took into account competing interests and values of the public. Many divergent public, personal, and professional opinions were expressed during the analysis. Though my decision will not likely please all who commented, their comments have helped to make this a better decision. The Selected Alternative provides a beneficial mix of resources for the public within the framework of the existing laws, regulations, policies, public needs and desires, and capabilities of the land, while meeting the stated purpose and need for this project. This decision is one suited to this project area. The Kuakan project area presents unique challenges and opportunities due to its location, physical geography, timber stand composition, and the size of the island. I believe the Selected Alternative best meets the goals and objectives developed for the area under the Forest Plan while balancing site-specific concerns unique to the project area and offering an opportunity to expand our knowledge concerning partial harvest and uneven-aged management, while achieving the purpose and need of the proposal.
- 2) My decision to implement this Selected Alternative is consistent with the Tongass Land and Resources Management Plan (modified 1997 TLRMP) and sound National Forest management. I have considered the need to help provide a

sustained level of timber supply to meet annual and TLMP planning cycle market demand, and to provide diverse opportunities for natural resource employment, consistent with multiple use and sustained yield of all renewable forest resources. The Kuakan timber sale project will help meet Southeast Alaska timber supply needs.

- 3) In the Selected Alternative I have amended the TLMP to relocate the small old-growth habitat reserve in VCU 525, from the west side of Deer Island to the north side of the island (see ROD map, pg. 21). The new location encompasses important goshawk, wolf and deer habitat, and was recommended by all agency biologists working on the Kuakan project. Relocating this small old-growth habitat reserve results in a reduction in the suitable timber base by 239 acres, some of which would be unavailable due to requirements for the maintenance of goshawk buffers around known nests. Additional information is contained in the nonsignificant TLMP amendment (ROD Appendix 2).
- 4) The Selected Alternative harvests approximately 12 MMBF of timber, which would contribute to meeting market demand for timber.
- 5) The Selected Alternative builds no roads. Roads and their associated use were a common issue or concern in public and agency comments we received on the Draft EIS and in response to scoping. As displayed in the EIS, road construction on Deer Island would be difficult and costly. Of particular concern is the area referred to as “the switchbacks” where the road would have to cross an area with high potential for mass failure. A road system would provide more economical harvest opportunities now and in the future for both large and small operators. However, an extensive road system on Deer Island would be more expensive than the average road to construct (FEIS Chapter 3, Transportation). The risk of mass slope failure on specific key portions of the proposed road system outweighs the economic benefits in this situation. This, in combination with the geography of the island described below, combine to make helicopter yarding on Deer Island more economically comparable with roaded options, while avoiding the site specific risk of slope failures described in the FEIS.
- 6) The Selected Alternative uses helicopter only harvest, with logs flown directly to barges or to the West LTF. Deer Island is long and narrow and surrounded by deep saltwater channels and bays. The combination of broken topography, difficult roading, and proximity of the entire island to saltwater all contribute to making helicopter management more desirable for Deer Island.
- 7) The Selected Alternative utilizes uneven-aged prescriptions to retain 65%-75% of the volume within stands. The prescriptions that I am choosing to implement on Deer Island are similar to experimental prescriptions incorporated in several “Alternatives to Clearcutting” study sites (Hanus Bay and Portage). Deer Island offers us an opportunity to further refine uneven-aged management prescriptions. Partial harvest is most effectively carried out through helicopter yarding, which Deer Island lends itself to.

- 8) All alternatives considered for the Kuakan project would meet or exceed the visual quality objectives for the Project Area. The Selected Alternative exceeds visual quality objectives through retention of 65%-75% of the existing structure within the stands. The units will not likely be noticeable to the casual viewer because the high percentage of retention would result in a textural change with no noticeable outline of the units. The combination of no road construction and helicopter harvest retaining 65%-75% of the volume provides the opportunity to harvest timber with minimal impact to the visual characteristic of the island. The Forest Plan has prescribed a Land Use Designation of "Modified Landscape" for most of the project area. Such a prescription has the general goal of providing a sustained yield of timber and a mix of resource activities while minimizing the visibility of developments in the foreground distance zone.
- 9) The Selected Alternative retains old-growth characteristics across the island, thus it is most responsive to wildlife species that are dependent on old growth habitat. The selected old-growth reserve includes three known goshawk nest sites and other critical wildlife habitat. The high retention within units and lack of roads will minimize potential impacts to small mammals, deer, marten, wolves and other wildlife species.
- 10) The Selected Alternative does not change access to Deer Island. There currently are no roads on the island, and none will be built with the Kuakan project. Recreational use of the island in its currently roadless condition can continue. There will be no effects to wildlife from improved access, since access to the island is not changed with the Selected Alternative.
- 11) The Selected Alternative allows reconstruction of the Deer Island West LTF to provide an upland area for helicopter staging, log landings, log sorting, and transferring logs between barges and saltwater. The Deer Island West LTF dive monitoring results are well within permit thresholds, thereby alleviating concern for bark accumulation associated with log-watering.
- 12) The State of Alaska has developed a plan for a network of roads and ferries throughout Southeast Alaska. The Southeast Alaska Transportation Plan includes a potential change in the current ferry route, using Ernest Sound as a main travel-way between Wrangell and Ketchikan. A change in the primary ferry route would bring more travelers through the Ernest Sound and Seward Passage waterways around Deer Island. However, these waterways on either side of Deer Island are already classified as Visual Priority Travel Routes, so all alternatives were designed to meet the heightened visual quality objectives for this classification. Since the Selected Alternative has the least impacts to visual quality, it also is responsive to proposed changes in traffic patterns that may result from the proposed State ferry system based on the current Southeast Alaska Transportation Plan.

How Significant Issues are Addressed

In making my decision, I considered four major issues identified during the planning process. In the following summary, I disclose how the Selected Alternative addresses each of the significant issues. Table S-1 and Chapter 3 of the Final EIS supplement the following discussion and provide a comparison of the alternatives.

Issue 1: Scenic, Recreation and Tourism Values

This issue addresses concerns for scenery and outdoor recreation opportunities offered in and around the Kuakan project area and the effects timber harvest may have on these opportunities.

The Selected Alternative will not build any roads, improve access or significantly affect the views from any use areas within or near the project area. It would not result in any noticeable change to the recreation setting of the project area.

Unit location and design were carefully considered in all alternatives to minimize visual impacts. All alternatives meet the TLMP visual quality objectives (VQOs) as specified from the priority travel routes, use areas, and their viewsheds. Key viewsheds of these priority travel routes and use areas include Frosty Bay, Seward Passage, Santa Anna Inlet, and Ernest Sound. The Selected Alternative, with partial harvest and uneven-aged management, will result in a slight textural change within the selected units, but may not be noticeable to the casual observer. The Selected Alternative exceeds the VQO as specified from the priority travel routes, use areas and their viewsheds.

In coming to this decision, I did consider the proposed changes to the State ferry route that may bring more passengers within relatively close viewing distance of the project area. Views of the island and surrounding landscape from ferries and small cruise ships are the only known potential large-scale recreation use that may occur near the project area. The Selected Alternative has the least impact on the viewshed this entry. The Selected Alternative is also adaptive in that it retains a high percentage of the original stand volume in all units, thus in the future, a variety of appropriate harvest prescriptions would be available. The Selected Alternative is very responsive to public input expressing concerns for the scenery in the project area.

Issue 2: Timber Supply and Economics

The Selected Alternative uses uneven-aged management through partial harvest methods to harvest timber from approximately 1,350 acres of old growth forest, retaining 65%-75% of the existing stand volume within the selected harvest units.

The Selected Alternative would provide about 12 MMBF of timber (from stand exam based estimates), which would contribute to the Forest Service's attempt to seek to meet market demand while being consistent with the Tongass Land Management Plan and the standards and guidelines for all resources. Timber from this sale is needed as

a component of the timber sale schedule to provide timber to industry in an even flow over the ten-year planning cycle. The timber volume is also necessary as a substantial component of the timber sale program to be offered in fiscal year 2000. The harvest economic analysis contained in the Final EIS resulted in a stumpage value range of \$31/MBF at low market conditions, to \$147/MBF at high market conditions for the Selected Alternative. Stumpage values actually received on timber sales are highly variable and are highly subject to market conditions at the time the sale is offered.

I believe incorporating several key components into the timber sale contract will improve the economic return of this alternative. Utilization standards require the operator to yard out all the wood from a cut tree except the branches, the top, and any rotten or unusable portions of the trunk. Normally, the "top" of the tree is anything 6 inches in diameter or smaller. By increasing the top diameter limit to 10" or 12," much of the lower-value top-wood can be left on the forest floor as hiding structure for small mammals. Many large-diameter trees contain high amounts of defect within the bole and large limbs which produce large knots, thus a lower-grade product. Small diameter trees generally produce lower grade products due to their size. Identification of trees to be removed by a diameter designation results in harvest of trees that have higher than average wood-recovery value, without sacrificing the integrity of the stand that they are removed from. With these considerations, I believe the Selected Alternative can result in an economically viable timber sale with a minimal impact to other resources.

The Kuakan project presents a unique situation in which the value of the tree species (somewhat heavier to both red and yellow cedar than is normal for many sales) in the project area is likely to support helicopter harvest if yarding distances are kept reasonable. The shape of Deer Island, where the project is proposed, is long and relatively narrow. This lends itself to shorter yarding distances for helicopter harvest to reach the suitable timber lands on the island than would be the case in sales on larger islands or on the mainland.

The combination of project specific timber species value, and the physical conformation of the island lend the project to a helicopter operation. Sale economics can be further enhanced in this situation if utilization standards can be addressed as described to decrease the amount of yarding of lower value material. From my review of the FEIS, I believe that an economic sale offering can be prepared under the Selected Alternative in many market conditions.

The long-term silvicultural impact of the Selected Alternative on timber supply is discussed in the EIS in the Silviculture and Timber Management section of chapter 3. This is an important element of the decision. The partial cut harvest prescriptions used in the Selected Alternative have not been widely used in the past on the Tongass National Forest. Retention of 65% to 75% of the original stand may not initiate regeneration in all portions of the stands that will be harvested due to the lack of openings created. We do know that regeneration for tree species such as hemlock and cedar is often optimized when sunlight can reach the developing tree on the forest floor. We also know that growth of individual trees is optimized when competition

between trees is minimized. Young trees in particular may have a difficult time growing if overtopped by larger trees in close proximity. The prescriptions used in the Selected Alternative may have the effect of lengthening the rotation age of the stand. When compared to an even-aged harvest, uneven-aged harvest would require a longer timeframe to produce an equal amount of harvestable timber volume. It may also be the case that the harvest proposed under the Selected Alternative may not create conditions that would stimulate new young trees to grow in all portions of the stand harvested. Second entries at a later date may be when enough sunlight can generally reach the forest floor to stimulate more widespread viable regeneration.

Even with this consideration in mind, my analysis of the FEIS leads me to conclude that the prescriptions for harvest used in the Selected Alternative are very likely to stimulate some regeneration (particularly where small openings in the canopy are created) and will likely lead to increased growth on the remaining trees in the stand. The large portion of the stand that will remain uncut actually builds some margin of adaptability into this decision if regeneration under the residual stand is found to be an issue in the future.

For this reason, I have included as a part of this decision, a monitoring plan that will specifically look at the long-term regeneration success resulting from the selected harvest prescriptions. Monitoring will be used to assess the results of the partial cut harvest prescription through time within the project. This monitoring, in combination with the results of various alternatives-to-clearcutting projects ongoing in the Alaska Region, should be used to adapt future harvest entries in the project area to the most current knowledge of silvicultural impacts of partial cut harvest prescriptions.

In addition, we will monitor the impacts of this alternative on the capability of the remaining stands to provide deer winter range and old-growth structure for other species such as marten. This monitoring will help refine future modeling and analysis on how old-growth forest structure and forage species are affected after partial-cut harvesting.

I believe the Selected Alternative is uniquely suited to the Kuakan project area, and that the risks of this alternative are known and acceptable in that they are limited in extent and can be mitigated by future actions. Further, the Selected Alternative is likely to result in an economically viable sale in many market conditions. In my judgement, the Selected Alternative (Alternative 5) is the most responsive to the combination of topography, geography, road building difficulty, accessibility for helicopter harvest, tree species, soils, visuals and wildlife circumstances unique to the project area.

Issue 3: Biodiversity and Wildlife Species of Concern

The Selected Alternative has the least effect of any of the action alternatives on wildlife habitat and species conservation in the Kuakan Project Area. Placement of the old-growth reserve on the north end of Deer Island is responsive to concerns for goshawk, wolf, deer and fish habitat. Lack of road construction is responsive to concerns for small mammals, marten, wolves, deer and other game species.

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Retention of 65% to 75% of the stand structure within harvest units is responsive to concerns for meeting habitat needs of wildlife species that are dependent on old-growth habitat.

Based on my review of the EIS, the impact of any of the alternatives developed would be acceptable in relation to biodiversity and wildlife species impacts. The Selected Alternative would likely have the least impact to wildlife as disclosed in the EIS. The reduced impacts to wildlife under the Selected Alternative were a favorable factor in my selection of this alternative, but were not the primary motivation for the selection. Under any alternative, more than 60% of the old growth in the project area is not available for harvest due to a combination of Forest Plan standards including beach fringe, riparian zone protection requirements and old growth units. The Selected Alternative, however, will serve to additionally mitigate wildlife impacts, particularly to species dependent on old-growth structure and those with limited dispersal abilities.

In reviewing Agency and public comments and the analysis contained in the EIS, I concluded that the small old growth unit would function best if located as recommended in Alternatives 5 and 6. The EIS describes the reasons for this preference in detail in Chapter 3, within the Biodiversity and Old-Growth sections. This is discussed in more detail in Appendix 2 of this Record of Decision.

I also concluded, based on the information provided in Chapter 3 of the EIS, that the utilization standards being sought under the sale should not have a negative environmental effect on wildlife and that the retention of some of the woody debris described could potentially have a favorable effect on small mammals while also benefiting timber sale economics.

Issue 4: Roads and Access Management

This issue is intertwined with the other key issues, and discussed throughout the FEIS. Balancing road construction concerns (cost, risk to soil, water, and visual resources); opportunities (possible improved economics, future management); new access opportunities (hunting, recreation); and impacts (subsistence competition, loss of unroaded recreation, impacts to wildlife); is challenging and unique to each project. The Selected Alternative builds no roads and does not change current access conditions for the island.

Given the unique combination of features specific to the project area discussed above, I believe the best choice for this sale is a helicopter yarding alternative. Such an alternative, given the geography of Deer Island, does provide reasonable access to the available suitable timber within the project area. This approach also avoids some steep unstable slopes, which could not effectively be avoided otherwise. The more limited road alternative (Alternative 3), though avoiding the unstable slope areas, actually appears to be a poorer choice economically than most of the other alternatives (FEIS, Chapter 2, Alternative Comparisons). In the case of Alternative 3, the limited volume accessed by road does not appear to offset the cost of the road building.

The potential benefit of public roaded access for recreation and other activities is reduced by the isolation of the project area and lack of significant “on-island” recreation opportunities. The public input I received concerning such opportunities, and the results of the analysis in the FEIS (Chapter 3, Recreation) did not make the expense of construction and maintenance of a road system on the island appear to be warranted solely for the limited recreational benefit it would provide. This, coupled with the other considerations related to road construction mentioned above, made me favor the selection of helicopter yarding with no road building. The reasons I selected Alternative 5 from among the no-road alternatives are stated above under issues 1 through 3.

Public Involvement

Public involvement has been instrumental in the identification and clarification of issues for this project. This has been helpful in the formulation of alternatives and has assisted me in making a more informed decision for the Kuakan project. Public meetings, *Federal Register* notices, newspaper and radio releases, open houses, the Stikine Area Project Schedule, and group and individual meetings were some of the tools used to solicit input for this project.

Notice of Intent: A Notice of Intent to Prepare an Environmental Impact Statement was published in the *Federal Register* on July 29, 1998, when it was decided that an EIS was to be completed for the project.

Public Comment received for the Draft EIS: Availability of the Draft EIS was announced in the Federal Register on July 9, 1999, with a deadline for public comments listed as August 30, 1999. A total of 16 letters were received during the comment period and were responded to in the Final EIS (Appendix H).

The Final EIS has been filed with the Environmental Protection Agency and is available to the public.

Coordination With Other Agencies

From the time scoping was initiated, meetings and site visits with all interested State and Federal agencies have occurred. Issues were discussed and information was exchanged.

Coordination meetings were held with the State of Alaska including the Department of Fish and Game and the Department of Environmental Conservation. The Alaska Coastal Management Plan (ACMP) consistency review process was initiated upon publication of the Draft EIS through the offices of the Alaska Division of Governmental Coordination.

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An interagency team of biologists representing the Fish and Wildlife Service, Alaska Department of Fish and Game, and the Forest Service reviewed the small old-growth reserve for location and function within the project area.

A Biological Assessment was prepared and sent to the U.S. Fish and Wildlife Service and to the National Marine Fisheries Service as part of the Section 7 consultation under the Endangered Species Act.

The Wrangell Cooperative Association is a federally recognized tribal government, and we consulted with them on possible cultural resource impacts as well as other resource impacts from the project.

The Final EIS identifies the agencies that were informed of and/or involved in the planning process (see *List of Agencies, Organizations, and Individuals to Whom Copies of this Statement Were Sent in Chapter 4 of the Final EIS*).

Alternatives Considered in Detail

Six alternatives were considered in detail in the Final EIS. Each action alternative is consistent with the Tongass Land Management Plan (1997) as modified by the 1999 Record of Decision. The analysis of each alternative displays (1) the areas considered for harvest, (2) the location of any proposed roads for access, (3) the type of logging systems to be used, and (4) site locations of log transfer facilities to be used. For a complete description of these alternatives refer to Chapter 2 of the Final EIS. The alternatives as developed in the Final EIS are:

Alternative 1 - This No-Action alternative represents the existing conditions in the Project Area, and serves as the baseline against which the effects of the other alternatives are measured. There would be no new resource outputs associated with this alternative. No road construction or timber harvest would occur at this time, but would be deferred to a future entry. Additional receipts to the State of Alaska would be foregone, existing timber-related jobs would not be sustained, and no new opportunities for timber-related jobs would be created. There would be no changes to scenery, recreation, subsistence, wildlife or fisheries resources.

Alternative 2 - This alternative was the Proposed Action presented during public scoping. This alternative was designed to optimize timber volume and harvest economics through use of cable and helicopter yarding systems. A Log Transfer Facility (LTF) and approximately 9 miles (14.4 km) of road would be constructed on the north and east sides of Deer Island to allow cable yarding in as many units as practical. This alternative would develop the entire road infrastructure potential for Deer Island. Harvest would be accomplished with a mixture of cable clearcuts with 15% retention, helicopter overstory removal with 15% to 25% retention, and helicopter group selections and patch cuts with 75% retention within units.

Alternative 3 - The theme of this alternative is to optimize the volume of cable harvestable timber on the north end of Deer Island while minimizing impacts to

wildlife habitat and visuals on the south end of the island, where previous harvest has occurred. This alternative would require construction of about 4 miles (6.4 km) of road to access the areas on the northern end that are accessible by cable yarding systems. Harvest would be accomplished primarily with a mixture of cable clearcuts with 10% to 20% retention, and helicopter overstory removal with 15% to 25% retention.

Alternative 4 - The theme of this alternative is to maximize helicopter harvest economics, while being responsive to concerns about wildlife habitat retention, visual impacts and increased access. Helicopter yarding would be used to harvest all timber, and no roads would be built. Harvest would be accomplished primarily with overstory removal, retaining 15% to 25% or more of the trees within harvest units.

Alternative 5 - The theme of this alternative is to emphasize wildlife habitat and security, visual objectives, and water quality by reducing clearcutting. This alternative treats larger blocks of land with 25% to 35% harvest within each block. Helicopter yarding would be used to harvest all timber, and no roads would be built. Harvest would be accomplished with a mixture of overstory removal, group selections, and individual tree designation.

Alternative 6 - The theme of this alternative is to mimic natural disturbance patterns. Some parts of Deer Island have been kept in an even-age state due to periodic wind events that blow down exposed stands. Other more protected parts of the island are maintained as old growth over time through the death of individual trees or groups of trees that subsequently fall and create an opening or site conditions that allow young trees to fill in the gap. This alternative treats areas that show evidence of windthrow potential with patch cuts or small clearcuts. Areas that appear to be more protected from wind disturbance are treated with group selections or overstory removal. Helicopter yarding would be used to harvest all timber, and no roads would be built. Harvest would be accomplished with a mixture of small clearcuts, overstory removal with 10% to 25% retention, group selections and patch cuts with 50% to 75% retention.

Environmentally Preferred Alternative

Based on a comparison of the alternatives and the discussion contained within Chapter 3 of the Final EIS, Alternative 1, the No Action Alternative, would cause the least environmental disturbance and is therefore the environmentally preferred alternative of all the alternatives studied in detail. Of the action alternatives, Alternative 5 is the environmentally preferred alternative.

Alternatives Not Considered in Detail

Cable Yarding Only Alternative - We considered an alternative that would only harvest units accessible by roads for cable yarding. The theme of this alternative was to emphasize logging economics by designing a sale that would not require helicopter yarding, which is assumed to reduce the benefit/cost ratio for timber harvesting. Such

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an alternative would greatly limit our ability to meet the desired condition of leaving varying densities of trees to create multi-structured stands, as well as the desire to manage for timber production on land that is in the suitable base, but not accessible by road. Therefore, this alternative was eliminated from detailed study. .

Combination Alternatives – Between and Draft and Final EIS, we considered several variations of alternatives that would have combined different aspects of Alternatives 4, 5 and 6. All of the variations considered would have drawn unit configurations and prescriptions from currently analyzed alternatives, and thus would have been within the range of effects as displayed in the analysis of alternatives presented in Chapter 3. Since the effects of any combination alternatives would have been within the range of effects already displayed, these alternatives were not presented in the FEIS for detailed study.

Planning Record

The planning record for this project includes the Draft EIS, Final EIS, TLMP, Alaska Regional Guide, material incorporated by reference, and all materials produced during the environmental analysis of this project. The planning record is available for review at the Wrangell Ranger District.

Mitigation

Mitigation measures are prescribed to avoid, reduce, minimize or eliminate the adverse effects of actions. These measures were applied in the development of the project alternatives, including the Selected Alternative, and in the design of the harvest units and road corridors. The *Mitigation Measures* section of Chapter 2 and Appendix G of the Final EIS discusses mitigation measures for all alternatives.

Mitigation measures applicable to the Selected Alternative include measures contained in the standards and guidelines of the TLMP, Alaska Regional Guide, and applicable Forest Service Manuals and Handbooks. The Final EIS includes site-specific mitigation measures described in Chapter 2, Unit Descriptions (Appendix A), and Mitigation Measures (Appendix G). These measures are adopted as part of this decision and will be implemented. Measures to avoid or minimize adverse environmental effects of the project have been incorporated into the Selected Alternative.

Monitoring

A monitoring program is the process by which the Forest Service can evaluate whether the resource management objectives of the final environmental documents have been implemented as specified and whether the steps identified for mitigating the environmental effects were effective. Monitoring requirements are specified in Appendix C of the Final EIS. These monitoring items are adopted as part of this decision and will be implemented.

Each monitoring item describes what will be done, what the information will tell us, how it will be done, what will be done with the information, and the approximate cost of the monitoring. Monitoring activities may reveal results that deviate from planned effects, in which case corrective actions are prescribed. The Wrangell Ranger District is responsible for ensuring that project implementation, mitigation, monitoring, and enforcement are accomplished as specified in the Final EIS.

Findings Required By Law

National Forest Management Act

The National Forest Management Act (NFMA) requires specific determinations in this Record of Decision: consistency with existing Forest Plans and Regional Guides, a determination of clearcutting as the optimal method of harvesting, and specific authorizations of created openings over 100 acres in size.

Tongass Land Management Plan - This decision is consistent with the modified 1997 Tongass Land and Resources Management Plan. I have reviewed the management direction, standards and guidelines, and the schedule of activities for the VCU included in the Selected Alternative, and find the Selected Alternative to be consistent with these elements. The activities authorized in this decision are consistent with the standards and guidelines and management prescriptions of the Forest Plan and 1999 Record of Decision.

Clearcutting as the Optimal Method of Harvesting – There are no clearcuts in the Selected Alternative.

Harvest Openings Over 100 Acres in Size - There are no harvest openings over 100 acres proposed for this project.

Tongass Timber Reform Act (TTRA)

Harvest units were designed and located to maintain a minimum 100-foot buffer zone for all Class I streams and Class II streams that flow directly into Class I streams as required in Section 103 of the TTRA. The actual widths of these buffer strips will often be greater than the 100-foot minimum. The design and implementation direction for the Selected Alternative incorporate Best Management Practices (BMPs) for the protection of all stream classes.

Endangered Species Act

Actions authorized in the Selected Alternative are not anticipated to have a direct, indirect, or cumulative effect on any threatened or endangered species in the Kuakan project area. The U.S. Fish and Wildlife Service and the National Marine Fisheries Service have concurred that the actions described within the proposed project are not likely to adversely affect threatened and endangered species. A complete biological assessment is included in the planning record for this project. I have determined that this action will not have any adverse impacts on any threatened or endangered species.

Bald Eagle Protection Act

A Memorandum of Understanding (MOU) between the Forest Service and the U.S. Fish and Wildlife Service to facilitate compliance with the Bald Eagle Protection Act restricts management activities within 330 feet of an eagle nest site. The Selected Alternative is not anticipated to have a significant direct, indirect, or cumulative effect on any bald eagle habitat.

Clean Water Act

The design of harvest units for the Selected Alternative were guided by standards, guidelines and direction contained in the Forest Plan, Alaska Regional Guide, and applicable Forest Service manuals and handbooks. The Unit Cards (Appendix A) contain specific details on practices prescribed to prevent or reduce non-point sediment sources. Reasonable implementation with site-specific application and monitoring of approved BMPs is expected to comply with applicable State Water Quality Standards Regulations. These regulations provide for variances from anti-degradation requirements and water quality criteria. The timber harvest operators will be responsible for compliance, including obtaining any variance required by the State, and will be monitored for compliance by the Forest Service.

No roads will be built with the Selected Alternative; therefore, no permits under Section 404 of the Clean Water Act are required.

Essential Fish Habitat

The Selected Alternative constructs no roads, thus no stream crossings, in the project area. There are very few Class I streams on Deer Island, and none of the units in the Selected Alternative border a Class I stream. Retention of 65% - 75% of the existing stand and stream buffers on Class III streams and v-notches will significantly reduce the potential for sediment introduction into the stream system. Helicopter harvest will provide adequate suspension over Class IV streams. The Best Management Practices described in the unit cards provide assurance of water quality and aquatic habitat protection for all freshwater streams and marine waters affected by the project. Based on the information presented in the FEIS, I have determined that the Selected Alternative is unlikely to adversely affect essential fish habitat.

National Historic Preservation Act

We conducted heritage resource surveys of various intensities in the Project Area. The State Historic Preservation Officer has been consulted, and the project complies with the provisions of 36 CFR part 800. I have determined that there will be no significant effects on cultural resources.

Federal Cave Resource Protection Act of 1988

The actions in the Selected Alternative will not have a direct, indirect, or cumulative effect on any significant cave in the Kuakan Project Area. No cave resources have been documented in the Project Area and no caves were discovered during field work done for this analysis.

ANILCA Section 810, Subsistence Evaluation and Findings

A subsistence evaluation was conducted for the six alternatives considered in detail, in accordance with ANILCA Section 810. The full analysis is located in the planning file for this project and summarized in Chapter 3 of the Final EIS. The evaluations in the Subsistence Report on abundance, distribution, access and competition for harvested resources in the project area indicate that there is no significant possibility of a significant restriction on subsistence uses of wildlife, fish, and shellfish, marine mammals, other foods, and timber resources as a result of this sale.

Coastal Zone Management Act

The Coastal Zone Management Act of 1972 (CZMA), while specifically excluding Federal lands from the coastal zone, requires that a Federal agency's activities be consistent with the enforceable standards of a state's coastal management program to the maximum extent practicable when the agency's activities affect the coastal zone.

The enforceable standards for timber harvest activities are found in the State Forest Practices Act. The standards and guidelines for timber management activities in the Kuakan Project Area meet or exceed the standards in the State Forest Practices Act.

I have determined that the proposed activities in the Selected Alternative are consistent with the Alaska Coastal Management Program to the maximum extent practicable. The State of Alaska has concurred with my determination.

Consumers, Civil Rights, Minorities and Women

No negative impacts to the civil rights of individuals or groups, including minorities and women are anticipated to be associated with this project. Additional information can be found in the TLMP Final EIS Chapter 3 and Appendix H, as well as Chapter 3 of the Kuakan Final EIS.

Executive Orders

EO 11988 (Floodplains) - Executive Order 11988 directs Federal agencies to take action to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains. The Selected Alternative will modify no floodplains. No roads will be constructed across floodplains, and no harvest will occur within floodplains.

EO 11990 (Wetlands) - Executive Order 11990 requires Federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the destruction or modification of wetlands. Soil moisture regimes and vegetation on some wetlands may be altered in some harvest units; however, these altered acres would still be classified as wetlands and function as wetlands in the ecosystem.

Because wetlands are found throughout the project area, it is not feasible to avoid all wetland areas. However, there are no development activities planned on the more biologically significant wetlands. I have determined that using only helicopter yarding, and constructing no roads will minimize effects to wetlands.

Record of Decision

EO 12898 (Environmental Justice) - Executive Order 12898 directs Federal agencies to identify and address the issue of environmental justice, i.e. adverse human health and environmental effects of agency programs that disproportionately impact minority and low-income populations. The order specifically directs agencies to consider patterns of subsistence hunting and fishing when an agency action may affect fish or wildlife. I have determined that implementation of the Selected Alternative will not cause adverse health or environmental effects that disproportionately impact minority and low-income populations.

EO 12962 (Recreational Fisheries) - Executive Order 12962 directs Federal agencies to conserve, restore and enhance aquatic systems to provide for increased recreational fishing opportunities nationwide. Section 1 of the Executive Order is most pertinent to the proposed activity. Section 1 directs Federal agencies to evaluate effects on aquatic ecosystems and recreational fisheries, develop and encourage partnerships, promote restoration, provide access, and promote awareness of opportunities for recreational fishery resources.

The effects of this project have been evaluated throughout the Final EIS, including effects to freshwater and marine resources. Partnerships are continuing to be used to leverage Federal project funds to address water quality concerns in areas of the Tongass National Forest, although none have been proposed for recreational fisheries in conjunction with this project.

The Selected Alternative attempts to minimize the effects on aquatic systems through project design, application of TLMP standards and guidelines, BMPs and site-specific mitigation measures. Recreational fishing opportunities will remain essentially the same because aquatic habitats are protected through implementation of BMPs and riparian buffers, and because no new access is provided. I have determined that there will be no significant effect to recreational fisheries.

Federal and State Permits

Federal and State permits necessary to implement the authorized activities are listed in Chapter 1 of the Final EIS.

Implementation Process

Implementation of this decision may occur no sooner than 50 days following publication of the legal notice of the decision in the *Petersburg Pilot*, the official newspaper of record. This timber sale is planned to be offered in the fall of 2000.

This project will be implemented in accordance with Forest Service Manual and Handbook direction for Timber Sale Project Implementation in FSM 2431.3 and FSH 2409.24. This direction provides a bridge between project planning and implementation and will ensure execution of the actions, environmental standards, and mitigation approved by this decision, and compliance with TTRA and other laws.

All applicable Best Management Practices (BMPs) will be applied to the Selected Alternative.

Implementation of all activities authorized by this Record of Decision will be monitored to ensure that they are carried out as planned and described in the Final EIS.

Appendix 1 of this Record of Decision contains the Selected Alternative harvest unit design cards. These cards are an integral part of this decision because they document the specific resource concerns, management objectives, and mitigation measures to govern the layout of the harvest units. These cards will be used during the implementation process to assure that all aspects of the project are implemented within applicable standards and guidelines and that resource impacts will not be greater than those described in the Final EIS. Similar cards will be used to document any changes to the planned layout as the actual layout and harvest of the units occurs with project implementation.

The implementation record for this project will display:

- each harvest unit as actually implemented,
- any proposed changes to the design, location, standards and guidelines, or other mitigation measures for the project, and
- the decisions on the proposed changes.

Procedure for Changes During Implementation

Proposed changes to the authorized project actions will be subject to the requirements of the National Environmental Policy Act (NEPA), the National Forest Management Act of 1976 (NFMA), Section 810 of the Alaska National Interest Lands Conservation Act, the Tongass Timber Reform Act (TTRA), the Coastal Zone Management Act (CZMA), and other laws concerning such changes.

In determining whether and what kind of NEPA action is required, the Assistant Forest Supervisor will consider the criteria for whether to supplement an existing Environmental Impact Statement (EIS) in 40 CFR 1502.9(c), and FSH 1909.15, sec. 18, and in particular, whether the proposed change is a substantial change to the Selected Alternative as planned and already approved, and whether the change is relevant to environmental concerns. Connected or interrelated proposed changes regarding particular areas of specific activities will be considered together in making this determination. The cumulative impacts of these changes will also be considered.

The intent of field verification is to confirm inventory data and to determine the feasibility and general design and location of a potential unit or road, not to locate final boundaries or road locations. Minor changes are expected during implementation to better meet on-site resource management and protection objectives. Many of these minor changes will not present sufficient potential impacts to require any specific documentation or other action to comply with applicable laws.

Record of Decision

Some minor changes may still require appropriate analysis and documentation to comply with FSH 1909.15, sec. 18.

Right to Appeal

This decision is subject to administrative appeal. Organizations or members of the general public may appeal this decision according to Title 36 Code of Federal Regulations (CFR) part 215. The appeal must be filed within 45 days of the date that legal notification of this decision is published in the *Petersburg Pilot*, the official newspaper of record. The written Notice of Appeal must be filed with:

Regional Forester
Forest Service
U.S. Department of Agriculture
P.O. Box 21628
Juneau, AK 99802-1628

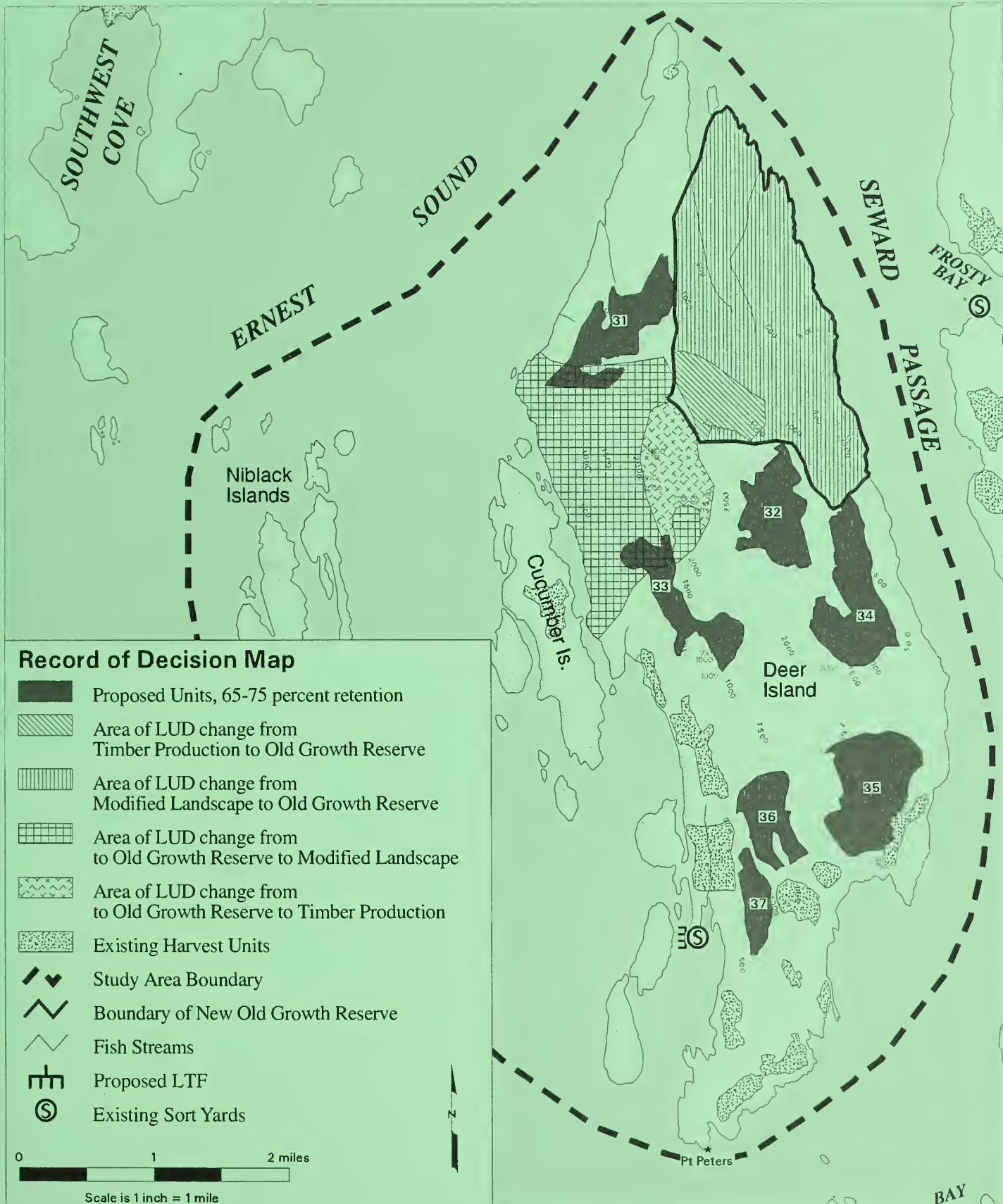
It is the responsibility of those who appeal a decision to provide the Regional Forester sufficient written evidence and rationale to show why the decision by the Assistant Forest Supervisor should be changed or reversed. This written Notice of Appeal must:

1. State that the document is a Notice of Appeal filed pursuant to 36 CFR Part 215;
2. List the name, address, and, if possible, the telephone number of the appellant;
3. Identify the decision document by title and subject, date of the decision, and name and title of the Responsible Official;
4. Identify the specific change(s) in the decision that the appellant seeks or portion of the decision to which the appellant objects;
5. State how the Responsible Official's decision fails to consider comments previously provided, either before or during the comment period specified in 36 CFR 215.6 and, if applicable, how the appellant believes the decision violates law, regulation or policy.

For additional information concerning this decision, contact Randy Hojem, Forest Service Interdisciplinary Team Leader, Wrangell Ranger District, P.O. Box 51, Wrangell, AK 99929, or call (907) 874-2323.


CAROL J. JORGENSEN
Assistant Forest Supervisor
Tongass National Forest

3-28-2000
Date



Appendices to the Record of Decision

APPENDIX 1 - Unit Cards for Selected Alternative

**APPENDIX 2 - Small Old Growth Habitat Reserve
Relocation in VCU 525
Non-Significant Amendment to the Forest
Plan**



ROD APPENDIX 1

Selected Alternative Unit Maps

Kuakan EIS

Unit Number 31

Treatment Acres 225

Volstrata Acres: Low 40 Medium 185 High 0 Net Volume (MBF/Acre): 9 MBF

Unit Development & Stand Description

Species composition is 42% hemlock, 5% Sitka spruce, 20% yellow-cedar, 33% western redcedar. This alternative treats a large area and removes from 25% to 35% of the stand volume in this entry. The net volume per acre shown above at 9 MBF is the amount estimated to be removed. About 65-75% of the volume will not be cut. No openings larger than 2 acres are expected and there will be some areas that will not have any trees cut. Trees to be harvested will be either marked, or designated by description, or a combination of methods will be used. Trees smaller than 9 inches at dbh will be cut only for safety reasons. It is estimated that very few trees smaller than 9 inches will be cut. The trees to be harvested will be the higher value trees. Trees with desirable structure for wildlife will be retained. A mix of tree species will be left. This unit contains areas of forested wetlands.

Alt. 5

Treatment	Individual & Group Selection
% Retention of Ac, Trees/Ac or Vol	65 to 75% Vol
% Volume Removed	25-35%
Leave trees for Marten	No
Harvest Volume (MBF)	2025
Cable Logging System Acres	None
Helicopter Logging System Acres	225
Yarded To	Barge

Stand Management Objectives:

Future stand will have several canopy layers. Overall stand will be uneven-aged. 65 to 75% of the stand is being retained to meet visual quality objectives, and to provide structure. Silvicultural prescriptions for wetland forests will maintain wetland functions. Western hemlock and western redcedar regeneration is expected. Possible future treatments may include a release cutting.

Water Quality & Fisheries

- Concern:** Unit contains Class III and IV tributaries to Froth and Foam Creeks (Class II) and an un-named Class III stream flowing directly to marine waters. Stream process group is HC.
- Mitigation:** No harvest within notch adjacent to HC streams. Verify presence of Class IV streams. Unit designed for helicopter yarding which will ensure that streams receive adequate suspension during yarding.

Soils

- Concern:** Occurrence of TLMP organic soils.
- Mitigation:** Field verify SMU 91B, if organic soils are found to occupy areas larger than 2 acres in size, exclude from the unit.

Wildlife

- Concern:** Eagle nest on adjacent beach.
- Mitigation:** Follow MOU direction to avoid helicopter or ground disturbance within the nest buffer.

Visuals

- Concern:** Meet the Modification VQO. This unit is visible from the North Ernest Viewpoint.
- Mitigation:** The irregular-shaped boundary and 65-75% retention will mitigate visual concerns.

Layout and Contract Concerns: Timing restrictions, wetlands, stream protection.

Mitigation Measures: F1, F2, F3, W4, W6, W10, V4.

225 ACRES

ALTERNATIVE 5

UNIT 31



- | | | | | | |
|--|-------------------|--|------------------|--|-----------------------------|
| | Class I Streams | | Eagle Nest Tree | | Proposed cut unit |
| | Class II Streams | | Riparian Buffers | | Adjacent proposed units |
| | Class III Streams | | TTRA Buffers | | Marten Guidelines Apply |
| | Class IV Streams | | | | Existing Harvest Units |
| | | | | | High Hazard Soils |
| | | | | | Saltwater and Lakes |
| | | | | | 1/4 Mile Eagle Nest Buffers |

Alternative	Prescription	Retention	Harvest System	Comments
5	ITM-Group Select	65-75	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 14 Medium 89 High 93

Net Volume (MBF/Acre): 9 MBF

Unit Development & Stand Description

Species composition is 76% hemlock, 18% Sitka spruce, 6% yellow-cedar, 0% western redcedar. This alternative treats a large area and removes from 25% to 35% of the stand volume in this entry. The net volume per acre shown above at 9 MBF is the amount estimated to be removed. About 65-75% of the volume will be not be cut. No openings larger than 2 acres are expected and there will be some areas that will not have any trees cut. Trees to be harvested will be either marked or designated by description or a combination of methods will be used. Trees smaller than 9 inches at dbh will be cut only for safety reasons. It is estimated that very few trees below 9 inches will be cut. The trees to be removed will be the higher value trees and trees with desirable structure for wildlife will be retained. A mix of tree species will be left.

Alt. 5	
Treatment	Individual & Group Selection
% Retention of Ac, Trees/Ac or Vol	65 to 75% Vol
% Volume Removed	25-35%
Leave trees for Marten	No
Harvest Volume (MBF)	1764
Cable Logging System Acres	None
Helicopter Logging System Acres	196
Yarded To	Barge

Stand Management Objectives:
Future stand will have several canopy layers. Overall stand will be uneven-aged. 65 to 75% of the stand is being retained to meet visual quality objectives, and to provide structure. Mostly western hemlock regeneration is expected. Possible future treatments may include a release cutting.

Water Quality & Fisheries
Concern: Unit may contain Class IV tributaries to marine water.
Mitigation: Verify Class IV streams. Helicopter yarding will ensure adequate suspension over streams.

Soils
Concern: Occurence of TLMP organic soils on the west side of the unit.
Mitigation: Field verify soil type, if organic soils are found to occupy areas larger than 2 acres in size, exclude from the unit.

Wildlife
Concern: Unit contains high value marten habitat.
Mitigation: Harvest prescription provides sufficient leave trees.

Visuals
Concern: Meet the Modification VQO. This unit is visible from the Frosty and Seward Viewpoints, and at an oblique angle from the Santa Anna Viewpoint.
Mitigation: The irregular-shaped boundary and 65-75% retention will mitigate visual concerns.

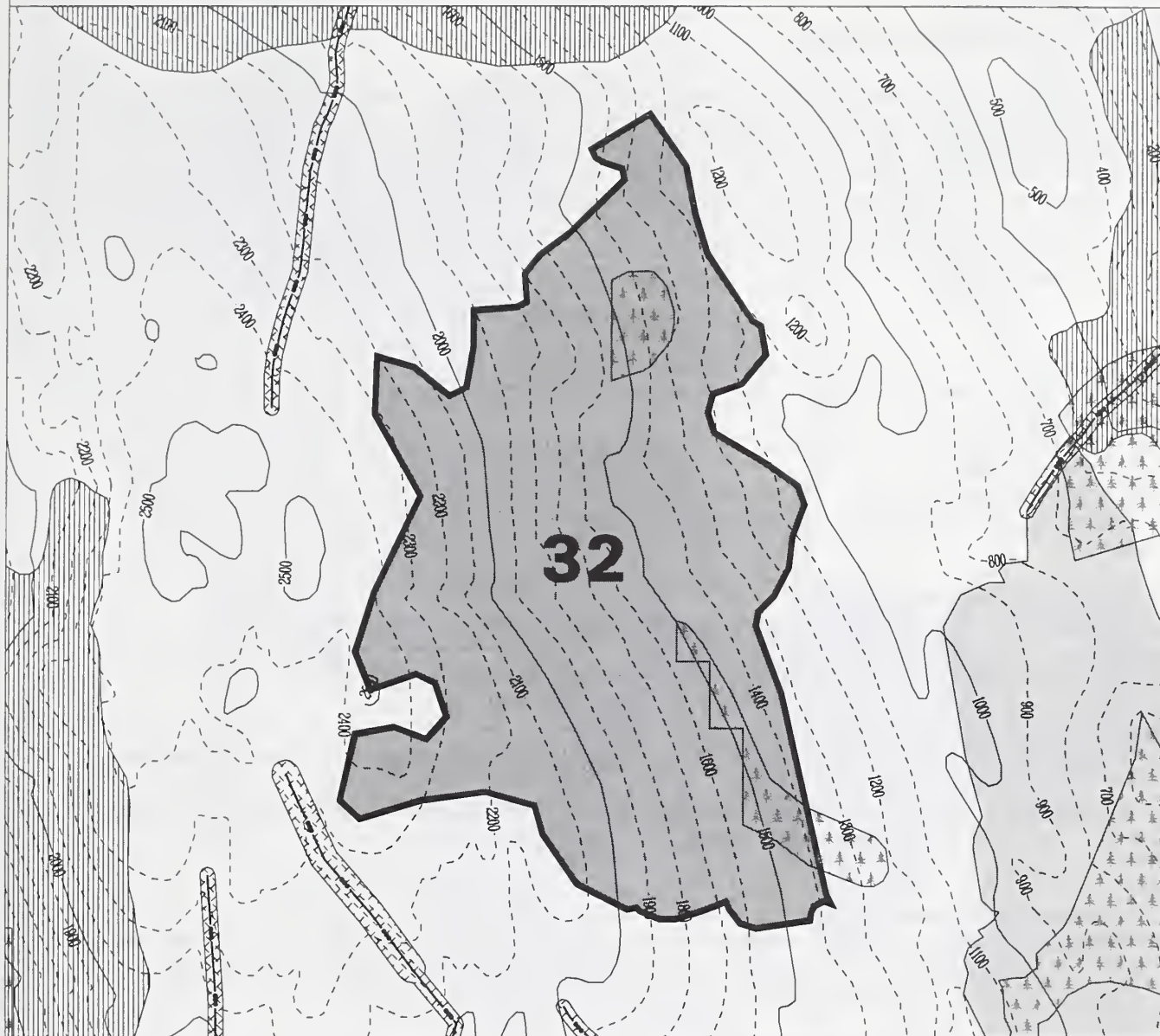
Layout and Contract Concerns: stream protection, if unmapped streams are found within the unit.

Mitigation Measures: F2, W4, W16, V4.

196 ACRES

ALTERNATIVE 5

UNIT 32



- | | | | | | |
|--|-------------------|--|------------------|--|-----------------------------|
| | Class I Streams | | Eagle Nest Tree | | Proposed cut unit |
| | Class II Streams | | Riparian Buffers | | Adjacent proposed units |
| | Class III Streams | | TTRA Buffers | | Marten Guidelines Apply |
| | Class IV Streams | | | | Existing Harvest Units |
| | | | | | High Hazard Soils |
| | | | | | Saltwater and Lakes |
| | | | | | 1/4 Mile Eagle Nest Buffers |

Alternative	Prescription	Retention	Harvest System	Comments
5	ITM-Group Select	65-75	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: February 10, 2000

ROD APPENDIX 1

Kuakan EIS				Unit Number 33			Treatment Acres 169		
Volstrata Acres:	Low	4	Medium	148	High	17	Net Volume (MBF/Acre):	9 MBF	

Unit Development & Stand Description

Species composition is 46% hemlock, 10% Sitka spruce, 34% yellow-cedar, 10% western redcedar. This alternative treats a large area and removes from 25% to 35% of the stand volume in this entry. The net volume per acre shown above at 9 MBF is the amount estimated to be removed. About 65-75% of the volume will not be cut. No openings larger than 2 acres are expected and there will be some areas that will not have any trees cut, therefore, windthrow is not expected to be a concern. Trees to be harvested will be either marked or designated by description or a combination of methods will be used. Trees smaller than 9 inches at dbh will be cut only for safety reasons. It is estimated that very few trees below 9 inches will be cut. The trees to be removed will be the higher value trees and trees with desirable structure for wildlife will be retained. A mix of tree species will be left.

Alt. 5

Treatment	Individual & Group Selection
% Retention of Ac, Trees/Ac or Vol	65 to 75% Vol
% Volume Removed	25-35%
Leave trees for Marten	No
Harvest Volume (MBF)	1521
Cable Logging System Acres	None
Helicopter Logging System Acres	169
Yarded To	Barge

Stand Management Objectives:

Future stand will have several canopy layers. Overall stand will be uneven-aged. 65 to 75% of the stand is being retained to meet visual quality objectives, and to provide structure. Mostly western hemlock and redcedar regeneration is expected. Possible future treatments may include a release cutting.

Water Quality & Fisheries

- Concern:

Unit contains Class III and IV tributaries to Deadhorse (Class II) and Bear (Class I) Creeks. Stream process group is HC.
- Mitigation:

No harvest within notch of Class III HC streams. Helicopter yarding provides adequate suspension over Class IV streams.

Soils

- Concern:

Unit contains areas of high hazard soils.
- Mitigation:

Unit layout will avoid slopes greater than 72% adjacent to the v-notch buffer on Deadhorse creek. Full suspension of logs is provided through helicopter yarding. Retention of > 60% of the stand is expected to maintain rooting strength.

Wildlife

- Concern:

Unit contains high value marten habitat.
- Mitigation:

Harvest prescription provides sufficient leave trees.

Visuals

- Concern:

Meet the Modification VQO. This unit is visible from the South Ernest Viewpoint.
- Mitigation:

The irregular-shaped boundary and 65-75% retention will mitigate visual concerns.

Layout and Contract Concerns: stream protection.

Mitigation Measures: F1, F2, F4, W4, W16, V4.

169 ACRES

ALTERNATIVE 5

UNIT 33



Class I Streams
Class II Streams
Class III Streams
Class IV Streams



Eagle Nest Tree
Riparian Buffers
TTRA Buffers



Proposed cut unit
Adjacent proposed units
Marten Guidelines Apply
Existing Harvest Units
High Hazard Soils
Saltwater and Lakes
1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
5	ITM-Group Select	65-75	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: February 10, 2000

ROD APPENDIX 1

Kuakan EIS Unit Number 34 Treatment Acres 260

Volstrata Acres: Low 71 Medium 86 High 103 Net Volume (MBF/Acre): 9 MBF

Unit Development & Stand Description

Species composition is 56% hemlock, 8% Sitka spruce, 25% yellow-cedar, 11% western redcedar. This alternative treats a large area and removes from 25% to 35% of the stand volume in this entry. The net volume per acre shown above at 9 MBF is the amount estimated to be removed. About 65-75% of the volume will not be cut. No openings larger than 2 acres are expected and there will be some areas that will not have any trees cut, therefore we do not expect windthrow to be a concern. Trees to be harvested will be either marked or designated by description or a combination of methods will be used. Trees smaller than 9 inches at dbh will be cut only for safety reasons. It is estimated that very few trees below 9 inches will be cut. The trees to be removed will be the higher value trees and trees with desirable structure for wildlife will be retained. A mix of tree species will be left.

Alt. 5

Treatment	Individual & Group Selection
% Retention of Ac, Trees/Ac or Vol	65 to 75% Vol
% Volume Removed	25-35%
Harvest Volume (MBF)	2340
Cable Logging System Acres	None
Helicopter Logging System Acres	260
Yarded To	Barge

Stand Management Objectives:

Future stand will have several canopy layers. Overall stand will be uneven-aged. 65 to 75% of the stand is being retained to meet visual quality objectives, and to provide structure. Mostly western hemlock regeneration is expected. Possible future treatments may include a release cutting.

Water Quality & Fisheries

- Concern: Unit contains Class III and IV streams tributary to marine waters. Stream process group is HC.
- Mitigation: No harvest within notch of Class III HC streams. Helicopter will provide adequate suspension over Class IV streams.

Soils

- Concern: High hazard soils adjacent to southwest unit boundary. Occurrence of TLMP organic soils.
- Mitigation: Avoid harvest on slopes exceeding 72% when they are adjacent to stream buffers. Field verify SMU 91B and 32B, if organic soils are found to occupy areas larger than 2 acres in size they will be excluded from the unit.

Wildlife

- Concern: Unit contains high value marten habitat. Eagle nest on adjacent beach.
- Mitigation: Harvest prescription provides sufficient leave trees. Follow MOU direction to avoid helicopter or ground disturbance within the nest buffer.

Visuals

- Concern: Meet the Modification VQO. This unit is partially visible from the Frosty and Seward Viewpoints, and at an oblique angle from the Santa Anna Viewpoint.
- Mitigation: The irregular-shaped boundary and 65-75% retention will mitigate visual concerns.

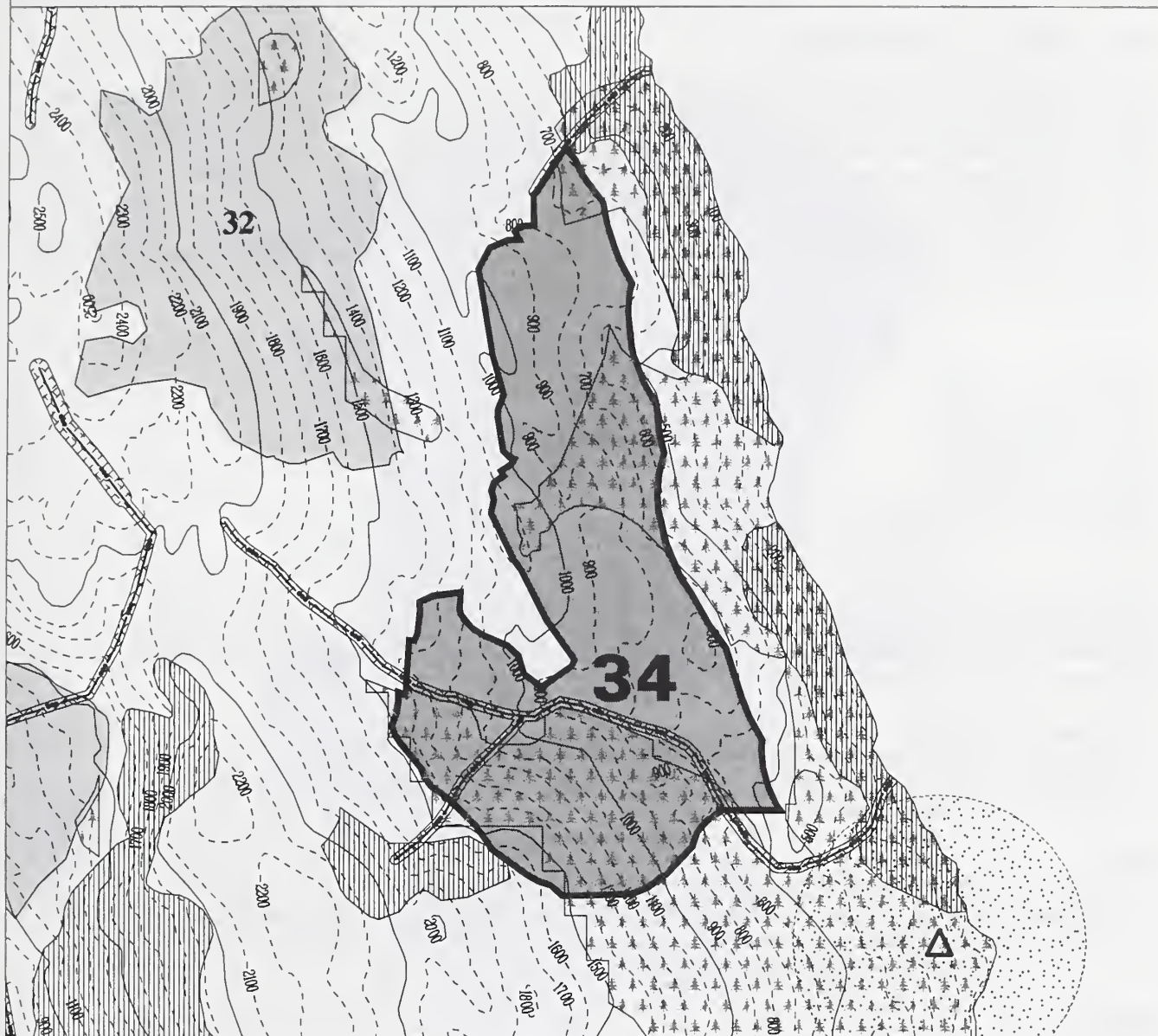
Layout and Contract Concerns: Timing restrictions, stream protection.

Mitigation Measures: F1, F2, F4, W4, W6, W10, W16, V4.

260 ACRES

ALTERNATIVE 5

UNIT 34



- | | | | | | |
|--|-------------------|--|------------------|--|-----------------------------|
| | Class I Streams | | Eagle Nest Tree | | Proposed cut unit |
| | Class II Streams | | Riparian Buffers | | Adjacent proposed units |
| | Class III Streams | | TTRA Buffers | | Marten Guidelines Apply |
| | Class IV Streams | | | | Existing Harvest Units |
| | | | | | High Hazard Soils |
| | | | | | Saltwater and Lakes |
| | | | | | 1/4 Mile Eagle Nest Buffers |

Alternative	Prescription	Retention	Harvest System	Comments
5	ITM-Group Select	65-75	Helicopter	

Scale: 1 inch = 1500 feet
*NOTE SMALLER SCALE

Last Updated: February 10, 2000

ROD APPENDIX 1

Kuakan EIS

Unit Number 35

Treatment Acres 284

Volstrata Acres: Low 3 Medium 132 High 149 Net Volume (MBF/Acre): 9 MBF

Unit Development & Stand Description

Species composition is 49% hemlock, 7% Sitka spruce, 16% yellow-cedar, 28% western redcedar. This alternative treats a large area and removes from 25% to 35% of the stand volume in this entry. The net volume per acre shown above at 9 MBF is the amount estimated to be removed. About 65-75% of the volume will be not be cut. No openings larger than 2 acres are expected and there will be some areas that will not have any trees cut, therefore windthrow is not expected to be a concern. Trees to be harvested will be either marked or designated by description or a combination of methods will be used. Trees smaller than 9 inches at dbh will be cut only for safety reasons. It is estimated that very few trees below 9 inches will be cut. The trees to be removed will be the higher value trees and trees with desirable structure for wildlife will be retained. A mix of tree species will be left.

Alt. 5

Treatment	Individual & Group Selection
% Retention of Ac, Trees/Ac or Vol	65 to 75% Vol
% Volume Removed	25-35%
Leave trees for Marten	No
Harvest Volume (MBF)	2556
Cable Logging System Acres	None
Helicopter Logging System Acres	284
Yarded To	Barge

Stand Management Objectives:

Future stand will have several canopy layers. Overall stand will be uneven-aged. 65 to 75% of the stand is being retained to meet visual quality objectives, and to provide structure. Mostly western hemlock and redcedar regeneration is expected. Possible future treatments may include a release cutting.

Water Quality & Fisheries

- Concern:** Unit contains Class III and IV streams tributary to marine waters. Stream process group is HC.
- Mitigation:** No harvest within notch of Class III HC streams. Helicopter will provide adequate suspension over Class IV streams.

Soils

- Concern:** High hazard soils in south and southwest part of the unit.
- Mitigation:** Avoid harvest on slopes exceeding 72% when they are adjacent to stream buffers. Unit boundary will be adjusted to avoid extremely steep slopes, landslide prone slopes. Retention of >60% of the trees is expected to maintain rooting strength.

Wildlife

- Concern:** Unit contains high value marten habitat. Eagle nest location on adjacent beach. Beach travel corridor has been compromised due to past logging.
- Mitigation:** Harvest prescription provides sufficient leave trees for marten. Follow MOU direction to avoid helicopter or ground disturbance within the nest buffer. Prescription will retain forest structure.

Visuals

- Concern:** Meet the Modification VQO. This unit is visible from the Santa Anna Viewpoint, and partially visible from the Seward Viewpoint.
- Mitigation:** The irregular-shaped boundary and 65-75% retention will mitigate visual concerns.

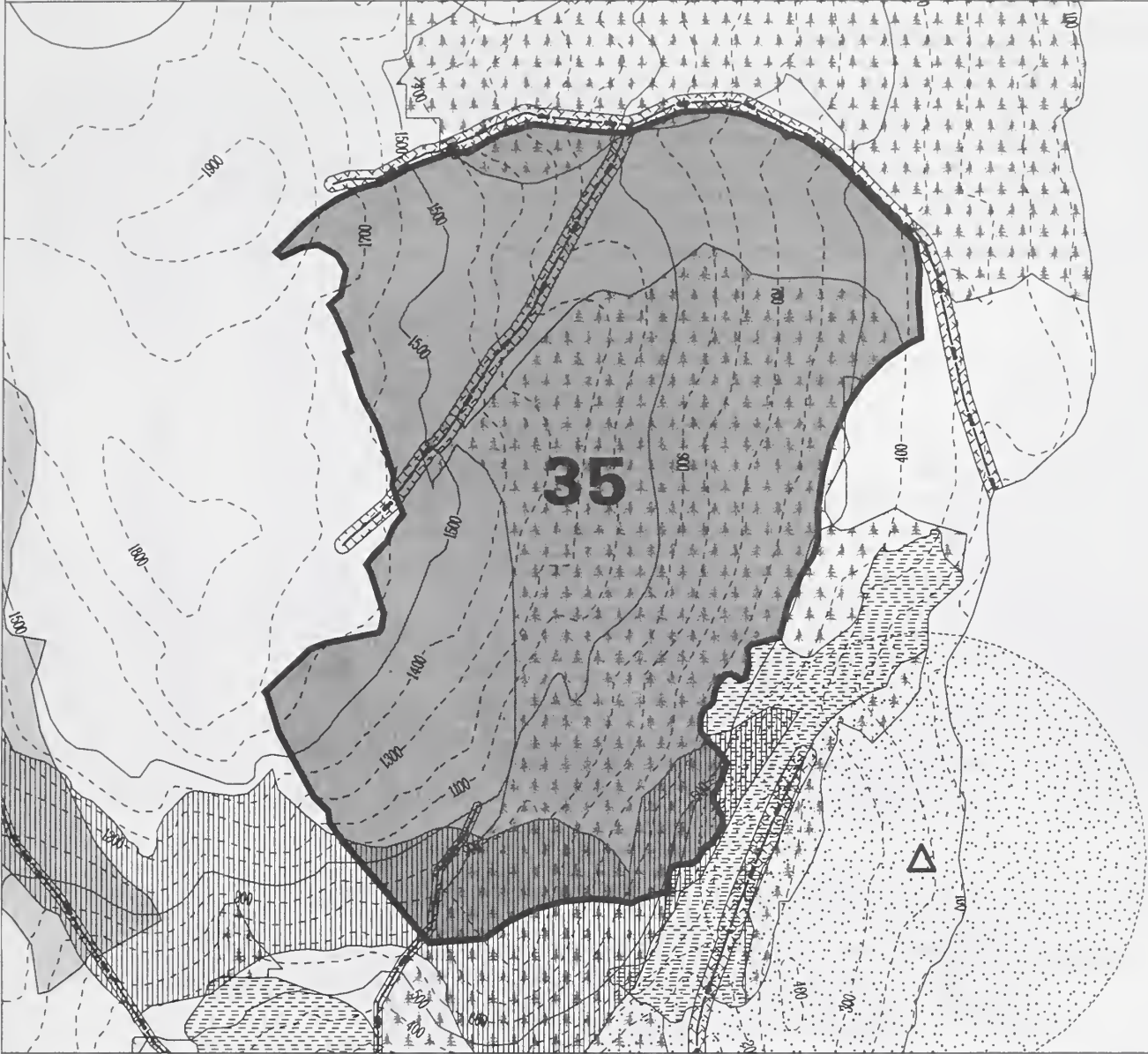
Layout and Contract Concerns: Timing restrictions.

Mitigation Measures: F1, F2, F4, W4, W6, W10, W16, V4.

284 ACRES

ALTERNATIVE 5

UNIT 35



- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Eagle Nest Tree
- Riparian Buffers
- TTRA Buffers
- Proposed cut unit
- Adjacent proposed units
- Marten Guidelines Apply
- Existing Harvest Units
- High Hazard Soils
- Saltwater and Lakes
- 1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
5	ITM-Group Select	65-75	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

ROD APPENDIX 1

Kuakan EIS

Unit Number 36

Treatment Acres 133

Volstrata Acres: Low 21 Medium 107 High 5 Net Volume (MBF/Acre): 9 MBF

Unit Development & Stand Description

Species composition is 56% hemlock, 19% Sitka spruce, 22% yellow-cedar, 3% western redcedar. This alternative treats a large area and removes from 25% to 35% of the stand volume in this entry. The net volume per acre shown above at 9 MBF is the amount estimated to be removed. About 65-75% of the volume will be not be cut. No openings larger than 2 acres are expected and there will be some areas that will not have any trees cut, therefore windthrow is not expected to be a concern. Trees to be harvested will be either marked or designated by description or a combination of methods will be used. Trees smaller than 9 inches at dbh will be cut only for safety reasons. It is estimated that very few trees below 9 inches will be cut. The trees to be removed will be the higher value trees and trees with desirable structure for wildlife will be retained. A mix of tree species will be left.

Alt. 5

Treatment	Individual & Group Selection
% Retention of Ac, Trees/Ac or Vol	65 to 75% Vol
% Volume Removed	25-35%
Leave trees for Marten	No
Harvest Volume (MBF)	1197
Cable Logging System Acres	None
Helicopter Logging System Acres	133
Yarded To	Barge

Stand Management Objectives:

Future stand will have several canopy layers. Overall stand will be uneven-aged. 65 to 75% of the stand is being retained to meet visual quality objectives, and to provide structure. Mostly western hemlock and redcedar regeneration is expected. Possible future treatments may include a release cutting.

Water Quality & Fisheries

- Concern:** Unit contains Class III and IV streams tributary to marine waters and may contain Class IV streams tributary to Bear Creek. Stream process group is HC.
- Mitigation:** No harvest within notch of Class III HC streams. Helicopter will provide adequate suspension over Class IV streams.

Soils

- Concern:** High hazard soils adjacent to Class IV stream on north and east side of unit. Occurrence of TLMP organic soils.
- Mitigation:** Avoid harvest on slopes exceeding 72% when they are adjacent to stream buffers. Retention of >60% of the trees is expected to maintain rooting strength. Field verify SMU 91B; if organic soils are found to occupy areas larger than 2 acres in size they will be excluded from the unit

Wildlife

- Concern:** Unit contains high value marten habitat. Eagle nest location on adjacent beach. Beach travel corridor has been compromised due to past logging.
- Mitigation:** Harvest prescription provides sufficient leave trees for marten. Follow MOU direction to avoid helicopter or ground disturbance within the nest buffer. Prescription will retain forest structure. Unit is located to leave a forested buffer between it and beach managed stand.

Visuals

- Concern:** Meet the Modification VQO. Unit is visible from the South Ernest Viewpoint, and may be partially visible from the Santa Anna Viewpoint.
- Mitigation:** The irregular-shaped boundary and 65-75% retention will mitigate visual concerns.

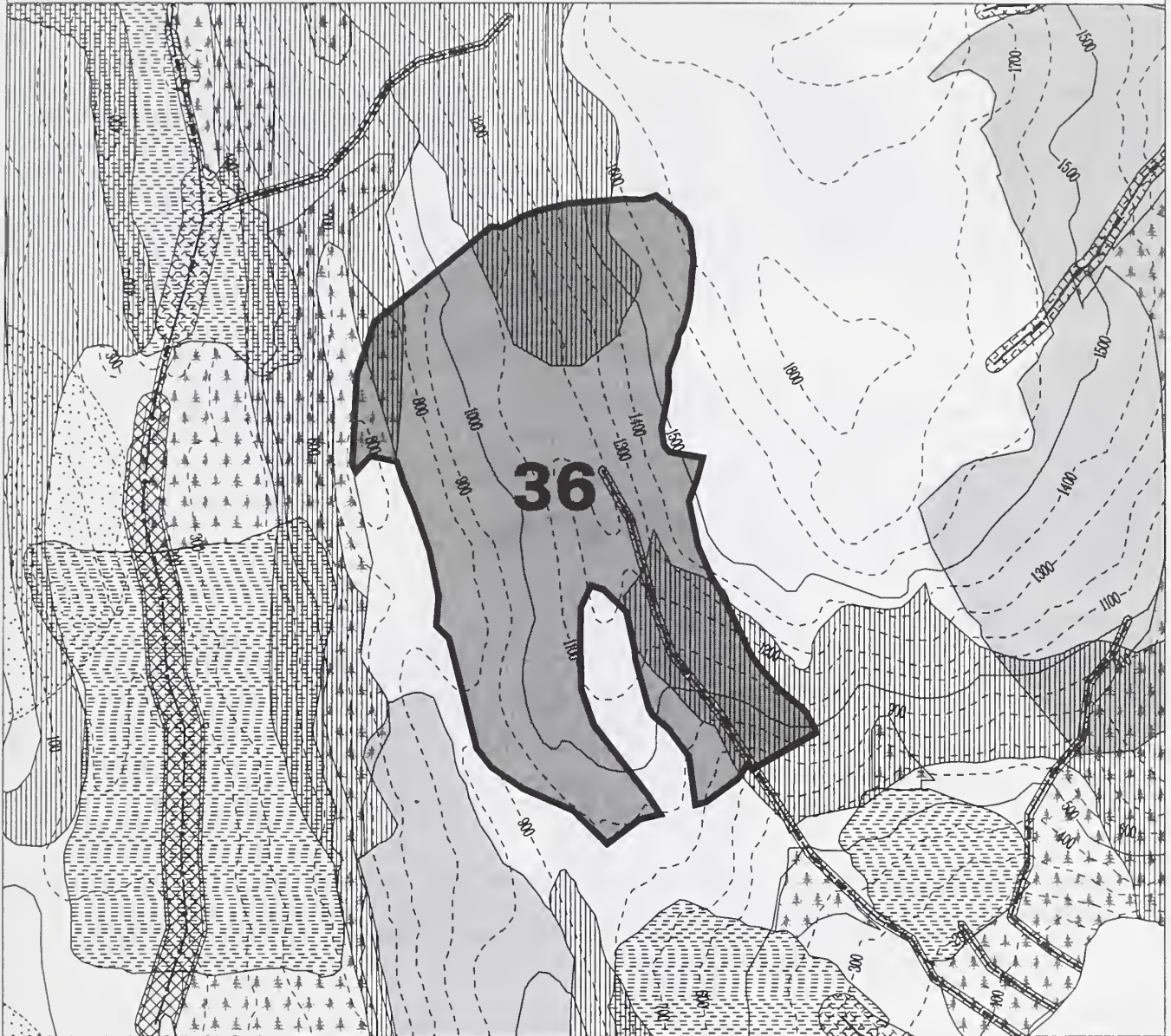
Layout and Contract Concerns: Timing restrictions.

Mitigation Measures: F1, F2, F4, W4, W6, W10, W16, V4.

133 ACRES

ALTERNATIVE 5

UNIT 36



- | | | | | | |
|--|-------------------|--|------------------|--|-----------------------------|
| | Class I Streams | | Eagle Nest Tree | | Proposed cut unit |
| | Class II Streams | | Riparian Buffers | | Adjacent proposed units |
| | Class III Streams | | TTRA Buffers | | Marten Guidelines Apply |
| | Class IV Streams | | | | Existing Harvest Units |
| | | | | | High Hazard Soils |
| | | | | | Saltwater and Lakes |
| | | | | | 1/4 Mile Eagle Nest Buffers |

Alternative	Prescription	Retention	Harvest System	Comments
5	ITM-Group Select	65-75	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

ROD APPENDIX 1

Kuakan EIS

Unit Number 37

Treatment Acres 78

Volstrata Acres: Low 12 Medium 65 High 1 Net Volume (MBF/Acre): 9 MBF

Unit Development & Stand Description

Species composition is 51% hemlock, 8% Sitka spruce, 21% yellow-cedar, 20% western redcedar. This alternative treats a large area and removes from 25% to 35% of the stand volume in this entry. The net volume per acre shown above at 9 MBF is the amount estimated to be removed. About 65-75% of the volume will be not be cut. No openings larger than 2 acres are expected and there will be some areas that will not have any trees cut, therefore we do not expect windthrow to be a concern. Trees to be harvested will be either marked or designated by description or a combination of methods will be used. Trees smaller than 9 inches at dbh will be cut only for safety reasons. It is estimated that very few trees below 9 inches will be cut. The trees to be removed will be the higher value trees and trees with desirable structure for wildlife will be retained. A mix of tree species will be left.

Alt. 5

Treatment	Individual & Group Selection
% Retention of Ac, Trees/Ac or Vol	65 to 75% Vol
% Volume Removed	25-35%
Leave trees for Marten	No
Harvest Volume (MBF)	702
Cable Logging System Acres	None
Helicopter Logging System Acres	78
Yarded To	Barge

Stand Management Objectives:

Future stand will have several canopy layers. Overall stand will be uneven-aged. 65 to 75% of the stand is being retained to meet visual quality objectives, and to provide structure. Mostly western hemlock and redcedar regeneration is expected. Possible future treatments may include a release cutting.

Water Quality & Fisheries

Concern: Unit may contain small Class IV streams.

Mitigation: Verify Class IV streams. Helicopter yarding will provide adequate suspension over streams.

Soils

Concern: Harvest on steep slopes. Occurrence of TLMP organic soils in northern tip of the unit.

Mitigation: Locate unit boundary to avoid slopes over 72%, or use harvest prescription to retain trees on steep slopes for rooting strength. Field verify SMU 91B, if organic soils are found to occupy areas larger than 2 acres in size they will be excluded from the unit.

Wildlife

Concern: Unit contains high value marten habitat. Eagle nest location on adjacent beach. Beach travel corridor has been compromised due to past logging

Mitigation: Harvest prescription provides sufficient leave trees for marten. Follow MOU direction to avoid helicopter or ground disturbance within the nest buffer. Prescription will retain forest structure. Unit is located to leave a forested buffer between it and beach managed stand.

Visuals

Concern: Meet the Modification VQO. Unit is visible from the South Ernest Viewpoint.

Mitigation: The irregular-shaped boundary and 65-75% retention will mitigate visual concerns.

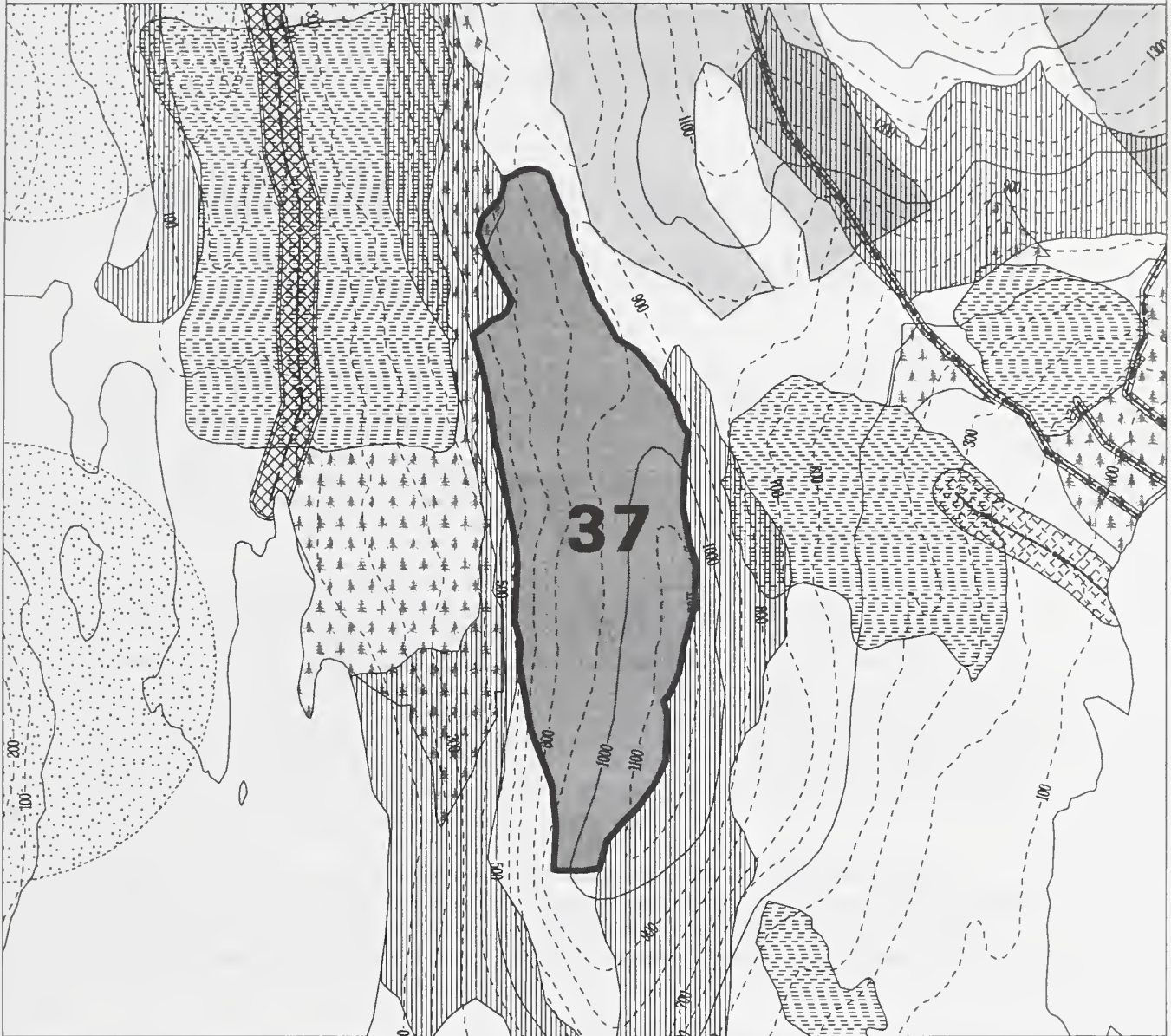
Layout and Contract Concerns: Timing restrictions, stream protection.

Mitigation Measures: F2, F4, W4, W6, W10, W16, V4.

78 ACRES

ALTERNATIVE 5

UNIT 37



Class I Streams
Class II Streams
Class III Streams
Class IV Streams



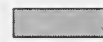
Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



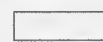
Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
5	ITM-Group Select	65-75	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: January 04, 2000



Non-Significant Amendment to the Forest Plan

Small Old Growth Habitat Reserve Adjustments in VCU 525

Based on the project level analysis process as described in the Old-growth Management Prescriptions and Appendix K of the Tongass National Forest Land and Resource Management Plan (1997), the Deer Island Small Old Growth Reserve, located in VCU 525 in the Kuakan Project Area, has been adjusted to better meet size, location and habitat composition criteria in the VCU. The reserve as mapped in the Forest Plan met the productive old growth acreage requirement for small reserves, but the size of the reserve was selected before the criteria in the Forest Plan were finalized and the total size of the reserve as mapped was smaller (by 325 acres) than 16% of the VCU, the criteria specified in Appendix K of the Forest Plan.

The Secretary of Agriculture's implementing regulation indicates the determination of significance is to be "...based on an analysis of the objectives, guidelines and other contents of the forest plan" (36 CFR 219.10(f)). The Forest Service has issued guidance for determining what constitutes a "significant amendment" under the National Forest Management Act. This guidance, in Forest Service Handbook (FSH) 1909.12 - Chapter 5.32, identifies four factors to be used in determining whether a proposed change to a forest plan is significant or not significant. These four factors are (1) timing; (2) location and size; (3) goals, objectives, and outputs; and (4) management prescriptions. The Alaska Region issued a Supplement to FSH 1909.12, Chapter 5.32, effective October 17, 1990 that includes an additional factor that can be considered in determining the significance of a Forest Plan Amendment. This additional factor deals with technical changes. An analysis of the factors is presented below.

Timing - The Tongass Forest Plan Revision was completed in 1997. The Old-growth Habitat Management Prescription in the TLMP indicates the small mapped reserves have received differing levels of field verification and integration of site-specific information in their design. During project level environmental analysis, for project areas that include or are adjacent to mapped old growth habitat reserves, the size, spacing and habitat composition of mapped reserves may be further evaluated.

Location and Size – The location of the Deer Island small old-growth reserve has been adjusted to an area on the northeast corner of the island (see the Record of Decision map, ROD page 21). The size of the adjusted reserve is 1564 acres, of which 655 acres were classified as suitable and available for timber production.

Goals, Objectives, and Outputs

Goals - The TLMP Goal for Biodiversity is to maintain healthy forest ecosystems; maintain a mix of habitats at different spatial scales (i.e. site, watershed, island, province and forest) capable of supporting the full range of naturally occurring flora, fauna, and ecological processes native to Southeast Alaska. The adjustment to the Deer Island Reserve is consistent with the Goals of the TLMP.

Objectives - The TLMP Objectives include: (1) to maintain a Forest-wide system of old growth forest habitat (includes reserves, non-development LUDs, and beach, estuary and riparian corridors) to sustain old growth associated species and resources; and (2) to ensure

ROD APPENDIX 2

that the reserve system meets the minimum size, spacing and composition criteria described in Appendix K of the TLMP. The adjustment to the Kuakan Reserve was specifically designed to meet the Forest Plan Objectives. The North Reserve incorporates important wildlife habitat including three known goshawk nests, and is the location recommended by the group of inter-agency biologist working on the project.

Outputs - Adjustment of the Deer Island Small Old Growth Reserve will have only minor effects on Forest Plan Outputs. The original TLMP reserve on the west side of Deer Island contained 931 acres of productive old growth (POG), 416 of which would be suitable aside from its designation within an old growth reserve. The North Deer Island Reserve contains 999 acres of productive old growth, 655 acres of which was suitable timber. Implementation of TLMP standards for 100-acre nest buffers around the three known goshawk nests would have removed 113 acres from the suitable base, if the reserve had not been moved. Thus, goshawk nest buffers would reduce the suitable base from 655 acres to 542 acres. The result of adjusting the Kuakan old-growth reserve from the TLMP location to the North Reserve location in terms of suitable POG is a net reduction of 126 acres of suitable POG from the overall timber base (542 acres minus 416 acres).

Cumulative Changes – Kuakan is one of nine NEPA decisions as of January 2000, to make non-significant amendments to the Tongass Forest Plan by modifying LUD boundaries. Niblack EA changed Wild River non-development LUD to Old Growth Habitat and Timber Management LUDs. The rest of the amendments involved enlargement or reduction of Old Growth Habitat LUDs, usually exchanging acres with one of the resource development LUDs in order to more effectively meet Forest Plan objectives. Usually, wherever an Old Growth Habitat LUD was expanded, it caused a corresponding reduction of acres suitable for timber harvest. Likewise, an Old Growth Habitat LUD size reduction usually meant an increase in suitable acres.

While LUD changes within project decisions each constituted non-significant Forest Plan amendments, Table 1 displays the accumulated effect on suitable acres for all projects. For each project the table displays suitable acres changed from a non-development LUD to a resource development LUD, or from a development LUD to Old Growth Habitat.

ROD - Table 1. Effects of Forest Plan Amendments on Acres Suitable for Timber Harvest as of January, 2000

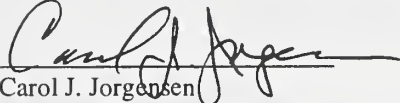
Project	Non-Development to Development LUD	Development to Non-Development LUD	Net Change in Suitable Acres
Kuakan	416	542	-126
Sea Level EIS	185	500	-315
Canal Hoya EIS	0	151	-151
Chasina EIS	0	78	-78
Control Lake EIS	446	142	304
Crystal Creek EIS	481	1153	-672
Nemo Loop EA	177	932	-755
Todahl Backline EA	2	363	-361
Niblack EA	252	0	252
Sum =	1959	3861	-1902

Management Prescriptions - The Deer Island Small Old Growth Reserve has been adjusted as noted in the TLMP Record of Decision and in accordance with the Old-growth Land Use Designation Management Prescription. None of the standards and guidelines associated with the Management Prescriptions has been changed.

Technical Changes - Technical changes to a Plan's management direction may be made on the basis of new information about the actual resource characteristics of the area. This category does not apply to the Kuakan Timber Sale.

Conclusion - Based on a consideration of the factors above, I conclude adoption of this amendment is not significant in a NFMA context. This amendment is fully consistent with current Forest Plan goals and objectives. The amendment provides added detail on implementation of the Old-growth Habitat Management Prescriptions of the Forest Plan.

This analysis in combination with the Kuakan FEIS and planning record, document my decision to amend the Forest Plan with a non-significant amendment by adjusting the Deer Island Small Old Growth Reserve as shown on the Kuakan Record of Decision Map.


Carol J. Jorgensen
Assistant Forest Supervisor

3-28-2000
Date



Kuakan Timber Sale

Final Environmental Impact Statement

March 2000

United States Department of Agriculture
Forest Service – Alaska Region

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USDA Forest Service
Tongass National Forest

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Abstract:

The USDA Forest Service proposes to make approximately 10 to 16 million board feet of timber available for harvest within the Kuakan Project Area on the Wrangell Ranger District, within the Tongass National Forest. The actions analyzed in this Environmental Impact Statement are designed to implement direction contained in the Modified 1997 Tongass Land and Resource Management Plan (TLMP). This Final Environmental Impact Statement describes the effects of five "action" alternatives and one "no action" alternative for harvesting timber in the Kuakan Project Area.

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Summary

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Summary Table

Summary

The Kuakan Timber Sale Project Area is located in Southeast Alaska on Deer Island, 35 miles south of the town of Wrangell, Alaska (see Figure 1-1). The project area is a group of islands bordered to the west by Ernest Sound, and to the east by Seward Passage. The project area includes all of Deer Island and the surrounding smaller islands, including the Niblack Islands to the west of Deer Island. These islands total approximately 9,555 acres and make up Value Comparison Unit (VCU) 525. All proposed activities are located on Deer Island which is 8,329 acres in size.

There are no roads in the Project Area at this time. Past timber management activity on Deer Island included 9 acres harvested by ground skidding on the western shore in the 1930's, and 456 acres harvested by helicopter principally along the south and west shorelines in 1989. In addition, much of the beach fringe was subject to selective harvest in the early 1900's.

Proposed Action

The initial proposed action for this project would harvest approximately 17 million board feet (MMBF) of timber on approximately 800 acres on Deer Island using a variety of harvest methods. A log transfer site would be constructed near the northeast tip of Deer Island. Approximately 9 miles of road would be constructed on the north and east sides of Deer Island. A variety of harvest methods would be used, which would leave various densities of trees in harvested areas. Both helicopter and cable yarding systems would be used. Approximately 85% of the volume would be yarded to and hauled over the road system, with the remaining 15% being yarded by helicopter directly to barges. The proposed action has been modified due to additional field information, and is represented in this Environmental Impact Statement (EIS) by Alternative 2, which proposes harvest on 689 acres (including road right-of-way) with a projected output of approximately 15.6 million board feet of timber.

The proposed action, and other action alternatives, include a proposed non-significant amendment to the Forest Plan to modify the small old growth reserve in VCU 525, which is currently undersized. Alternatives 2, 3 and 4 propose to increase the size of the reserve by adding adjacent acres on Deer Island and including the largest islands immediately west of the Forest Plan old-growth reserve. Alternatives 5 and 6 propose to change the location of the reserve to the northeast portion of Deer Island.

Purpose and Need

The Kuakan Timber Sale is proposed at this time to respond to goals and objectives of the Forest Plan, and to help fulfill desired future conditions described in that plan. The Forest Plan includes both forest-wide goals and objectives, and area-specific (land use designation) goals, objectives, and desired future conditions. Applicable forest-wide goals and objectives include:

1. Manage the timber resource for production of saw timber and other wood products from suitable timber lands made available for timber harvest, on an even-flow, long-term sustained yield basis and in an economically efficient manner.
2. Seek to provide a timber supply sufficient to meet the annual market demand for Tongass National Forest timber, and the market demand for the planning cycle.
3. Recognize the scenic values of suitable timber lands viewed from identified popular roads, trails, marine travel routes, recreation sites, bays, and anchorages, and to modify timber harvest practices accordingly.
4. Maintain and promote industrial wood production from suitable timber lands, providing a continuous supply of wood to meet society's needs.

Four Forest Plan Land Use Designations (LUDs) are within the Project Area. The goals of two of the four, Modified Landscape and Timber Production, are similar to the forest-wide goals and objectives listed above. For Timber Production, the desired future condition is to have healthy tree stands in a balanced mix of age classes from young stands to trees of harvestable age, and a road system providing access for timber management as well as recreation, hunting and fishing, and other public uses. Modified Landscape includes these desired conditions and also takes into account the scenic quality of foreground landscapes.

Project Issues

The third land use designation in the Project Area is Old-growth Habitat. Its primary goal is to maintain areas of old-growth forests to provide habitat for old-growth associated wildlife species. Within areas allocated to Old-growth Habitat, the desired condition is that all forested areas attain old-growth forest characteristics and provide a diversity of old-growth habitat types.

The fourth land use designation in the Project Area is Semi-remote Recreation. Areas allocated to Semi-remote Recreation are characterized by generally unmodified natural environments where ecological processes and natural conditions are only minimally affected by past or current human uses or activities.

Significant issues for the Kuakan Project were identified through public and internal scoping. The following four issues are addressed through the proposed action and alternatives.

Issue 1: Scenic, Recreation and Tourism Values

People are concerned about how this sale will change the scenic conditions, and recreation and tourism potential in the Deer Island area.

Issue 2: Timber Supply and Economics

This issue relates to the economic viability of proposed timber sales, and the potential employment and revenues generated by the project.

Issue 3: Biodiversity and Wildlife Species of Concern

Timber management on a relatively small island such as Deer Island raises concerns for wildlife populations within the project area.

Issue 4: Roads and Access Management

Deer Island is currently unroaded. Building roads in previously unroaded areas is of national concern, in addition to being a local issue.

The proposed action and each action alternative provide a different response to the significant issues while still meeting the stated purpose and need. Each of these alternatives represents a site-specific proposal developed through intensive interdisciplinary team evaluation of timber harvest unit and road design, including field verification.

The Forest Service uses many mitigation and preventive measures in the planning and implementation of land management activities. The application of these measures begins during the planning and design phases of a project, and continues through all phases of subsequent forest management and monitoring related to the project. The site-specific application of Forest Plan standards and guidelines and other mitigation measures are identified on the harvest unit and road cards for the project (located in Appendices A and B).

Each alternative complies with the Forest Plan conservation biology strategy designed to ensure well-distributed viable populations of wildlife. The boundaries of the small old-growth habitat reserve have been evaluated with interagency involvement and adjustments have been proposed to include more high-value winter habitat for deer (lower-elevation old-growth forest). Two adjustment scenarios have been proposed. Alternatives 2, 3 and 4 include one scenario, while Alternatives 5 and 6 include the other. All applicable Forest Plan Standards and Guidelines are incorporated, including those protecting beach and estuary fringe habitats, riparian areas, fish habitat, heritage (cultural and historical) resources, soil productivity, and water quality.

All roads have been located and will be designed to avoid or minimize effects on wetlands. Risks from windthrow have been evaluated, and means to minimize windthrow are incorporated into all harvest unit prescriptions. All units within the viewshed of a priority travel route or use area, as identified in the Forest Plan, have been designed to meet the visual quality objectives of the Modified Landscape Land Use Designation.

Alternatives to traditional clearcutting are prescribed for almost all harvest units. Proposed harvest units will meet the Forest Plan standards and guidelines for goshawks and marten by leaving varying amounts of structure within the units.

Alternative Development

Alternatives Considered

The proposed action (Alternative 2) and five alternatives are considered in detail. The general theme of each alternative is described below.

Alternative 1 (No action)

Alternative 1 proposes no new timber harvest or road construction from the Kuakan Project Area at this time. It does not preclude timber harvest from other areas at this time, or from the Kuakan Project Area at some time in the future. Alternative 1 represents the existing condition against which all other alternatives are compared.

Alternative 2

This alternative was designed to optimize timber volume and harvest economics through use of cable and helicopter yarding systems. A Log Transfer Facility (LTF) and approximately 9 miles (14.4 km) of road would be constructed on the north and east sides of Deer Island to allow cable yarding in as many units as practical. This alternative develops the entire specified road infrastructure potential for Deer Island. Harvest would be accomplished with a mixture of cable clearcuts with 15% retention, helicopter overstory removal with 15% to 25% retention, and helicopter group selections and patch cuts with 75% retention within units.

Alternative 3

The theme of this alternative is to optimize the volume of cable harvestable timber on the north end of Deer Island while minimizing impacts to wildlife habitat and visuals on the south end of the island, where previous harvest has occurred. This alternative would require construction of about 4 miles (6.4 km) of road to access the areas on the northern end that are accessible by cable yarding systems. Harvest would be accomplished primarily with a mixture of cable clearcuts with 10% to 20% retention, and helicopter overstory removal with 15% to 25% retention.

Alternative 4

The theme of this alternative is to maximize helicopter harvest economics, while being responsive to concerns about wildlife habitat retention, visual impacts and increased access. Helicopter yarding would be used to harvest all timber, and no roads would be built. Harvest would be accomplished primarily with overstory removal, retaining 15% to 25% or more of the trees within harvest units.

Alternative 5

The theme of this alternative is to emphasize wildlife habitat and security, visual objectives, and water quality by reducing clearcutting. This alternative treats larger blocks of land with 25% to 35% harvest within each block. Helicopter yarding would be used to harvest all timber, and no roads would be built. Harvest would be accomplished with a mixture of overstory removal, group selections, and individual tree marking.

Alternative 6

The theme of this alternative is to mimic natural disturbance patterns. Some parts of Deer Island have been kept in an even-age state due to periodic wind events that blow down exposed stands. Other more protected parts of the island are maintained as old growth over time through the death of individual trees or groups of trees that subsequently fall and create an opening or site conditions that allow young trees to fill in the gap. This alternative treats areas that show evidence of windthrow potential with patch cuts or small clearcuts. Areas that appear to be more protected from wind disturbance are treated with group selections or overstory removal. Helicopter yarding would be used to harvest all timber, and no roads would be built. Harvest would be accomplished with a mixture of small clearcuts, overstory removal with 10% to 25% retention, group selections and patch cuts with 50% to 75% retention.

Summary Table-1 at the end of this section provides an overview of some of the outputs, activities or effects of the alternatives.

Comparison of Alternatives By Key Issue

Each alternative addresses the project issues differently. Following is a brief discussion of how the alternatives respond to the four significant issues. Frequent use is made of the information in Summary Table-1 at the end of this section.

Issue 1: Scenic, Recreation and Tourism Values

People are concerned about how this sale will change the scenic conditions, and recreation and tourism potential in the Deer Island area. All alternatives are designed to meet Forest Plan objectives by meeting the Visual Quality Objectives (VQO) prescribed. When examining the change to the scenery proposed in each alternative, the ranking of the alternatives vary depending on the point from which you view the Project Area. By averaging the ranking each alternative received from the five different viewpoints, the ranking would be as follows (from least visible change, to most visible change): Alternative 1, Alternative 5, Alternative 6, Alternative 4 and 3 (tie), Alternative 2.

In examining the recreation setting for the Project Area, Alternatives 1 and 5 would not result in any noticeable change. Alternatives 6 and 4 would be similar in that there are no roads proposed, but both propose visible harvest that may detract from some peoples' recreation experiences. Alternative 2 and 3 would have the most impact, based on the roads and noticeable harvest proposed in these alternatives.

Issue 2: Timber Supply and Economics

This issue relates to the economic viability of proposed timber sales, and the potential employment and revenues generated by the project.

People are concerned about the economic viability of the proposed timber sale. In the EIS, we compare alternatives under both a "high market" and a "low market" projection. Analysis of the action alternatives harvest economics under a high market scenario indicates that Alternative 2 is the most economically viable. Alternative 2 is followed by Alternatives 5, 6, 4, and 3 in economic viability. Analysis of the harvest economics of each action alternative under a low market scenario indicates that Alternative 2 is the most economically viable. Alternative 2 is followed by Alternatives 5, 4, 6 and 3 in economic viability.

All alternatives produce positive stumpage returns in both the "high" and "low" markets as shown in Summary Table-1. Actual stumpage returns are very difficult to predict, and the values displayed should be considered relative comparisons of alternatives, rather than definitive predictions of actual returns.

People are concerned about the potential employment and revenues generated by the project. Alternative 2 provides the most potential for employment, followed in order by Alternatives 4, 5, 3, 6 and 1. Alternative 2 provides the highest monetary return to the State of Alaska (through the 25% Fund Act of 1908), followed in order by Alternatives 3, 4, 5, 6 and 1. Alternative 4 provides the highest net value to the public (based on expected costs to implement, and average returns to the public), followed in order by Alternatives 2, 6, 5, 3 and 1. Alternative 2 has the highest annual road maintenance cost, followed by Alternative 3. The other alternatives have no annual road maintenance cost (no proposed road construction).

Issue 3: Biodiversity and Wildlife Species of Concern

Deer Island is 8329 acres. Alternatives examined in this EIS propose to harvest between 456 and 1345 acres on the island in treatments which vary in intensity from clearcuts to partial cuts. The relatively small size of Deer Island calls for careful consideration of timber harvesting impacts on biodiversity in general and on wildlife species of concern. Unlike what may occur on larger islands or the mainland, many species cannot easily move or shift locations if we reduce the quantity or quality of habitat within the project area.

Under the Forest Plan, Deer Island is surrounded by a variety of development and non-development LUDs (see Figure Intro-1, page 3-3). The conservation biology strategy, including wildlife viability, on the Tongass is dependent on well-designed large, medium and small old-growth reserves and also on connectivity and how the non-reserved land is managed over time. Biologists involved with this project agree that the north reserve holds the highest wildlife values of the three options considered for placement of the old-growth habitat reserve within VCU 525. This recommendation was made after consultation with the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game. Alternative 5 and 6 contain

the north reserve option, and therefore rank higher than Alternatives 4, 3 and 2 with this measure.

In examining additional effects to overall biodiversity, Alternatives 5, 6 and 1 have the least amount of impact. Alternatives 5, 6, 3 and 1 have the least effect on medium-high volume habitats. Alternative 5 retains more forest structure with this entry, but treats more acres than Alternative 6. Alternative 6 uses an "ecological approach" by considering natural wind disturbance patterns in the design of harvest units. Alternatives 2 and 4 would have a higher impact to overall biodiversity and old-growth based on the combination of prescriptions and number of acres treated.

People have specifically asked us to take a close look at endemic mammals, goshawks, wolves and deer (with regards to subsistence). Alternatives 1 and 5 do the best at addressing the needs of these species by retaining the most forest structure. Although Alternative 5 treats the most overall acres, it retains 65-75% of the structure within those acres, and does not create any large openings. Alternative 6 closely follows 5 by harvesting on fewer acres and using an ecological approach to design harvest units. Alternatives 2 and 3 are less desirable for species that are sensitive to road density. Alternatives 1, 5 and 6 will have fewer impacts to wildlife species of concern followed by 3 or 4 (similar rank) and 2.

Issue 4: Roads and Access Management

Deer Island is currently unroaded. Building roads in previously unroaded areas is of national concern, in addition to being a local issue. While some people would like to see no roads constructed in the project area, others would like to see roads built for recreational and hunting opportunities, as well as for timber harvest reasons.

Alternatives 1, 4, 5 and 6 construct no roads, keeping the island in an unroaded condition. Alternative 3 would construct 3 miles of specified road and 1 mile of temporary road. Alternative 2 would construct 6 miles of specified road and 3 miles of temporary road.

Following harvest, in both Alternatives 2 and 3, all roads beyond the first two miles of the mainline road (Road 6700) would be decommissioned, with the removal of drainage structures. The mainline road will remain intact for the first two miles, with drainage structures remaining in place. However, the road will be closed to motorized traffic through installation of a gate near the LTF and an administrative closure order. The LTF would also be decommissioned, with the bulkhead and rock ramp removed.

Summary

Summary Table-1 compares treatment acres, predicted harvest volume and environmental impacts for each of the action alternatives.

**Summary Table-1
Alternative Comparison Table**

	Alt 1 No Action	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Total Acres Classified as Available for Harvest ¹	2688	2745	2745	2745	2513	2513
Proposed Treatment Acres ²	0	785	642	738	1345	692
% of Available Treated	0	29%	23%	27%	54%	28%
Proposed Harvest Acres ³ (including ROW ⁴)	0	689	456	689	1345	475
% of Available Harvested	0	25%	17%	25%	54%	19%
% of Total Productive Forest⁵ (7358 acres) Harvested	0	9%	6%	9%	18%	6%
Harvest by Volume Strata (acres, including ROW)						
Low Volume (1172 acres existing)	0	75	45	70	165	48
Medium Volume (4295 acres existing)	0	366	229	382	812	322
High Volume (1891 acres existing)	0	248	182	237	368	105
Harvest by Management System (acres)						
Even-aged	0	121	42	0	0	107
Two-aged	0	551	374	672	0	340
Uneven-aged	0	17	40	17	1345	28
Total Volume (MMBF)	0	15.6	10.5	15.0	12.1	10.3
Cable Yarded	0	8.0	2.6	0	0	0
Helicopter Yarded	0	6.9	7.6	15.0	12.1	10.3
ROW Volume	0	.7	.3	0	0	0
Net Stumpage (\$/MBF)						
Under High Market Conditions	0	\$191	\$154	\$155	\$157	\$157
Under Low Market Conditions	0	\$43	\$6	\$15	\$31	\$9
Number of Direct Jobs Produced During Life of Sale	0	100	68	96	78	66
Specified Road (miles)	0	6.25	3.10	0	0	0
Temporary Road	0	3.11	1.04	0	0	0
Total Road Miles	0	9.36	4.14	0	0	0
Road Density (miles of road/sq. mile)	0	.6	.3	0	0	0
Log Transfer Sites	0	2	2	1	1	1
Sort Yard Sites	0	1	1	0	0	0
Visibility Ranking (1 = least visible change, 6 = most visible change)						
From Frosty Viewpoint	1	6	5	4	2	3
From Seward Viewpoint	1	6	4	5	2	3
From Santa Anna Viewpoint	1	6	3	4	2	5
From South Ernest Viewpoint	1	4-5	3	4-5	2	6
From North Ernest Viewpoint	1	5-6	5-6	4	2	3
ROS Class (% of Project Area)						
Semi Primitive Non-Motorized	11%	0	0	0	11%	0
Semi Primitive Motorized	52%	30%	30%	30%	52%	40%
Roaded Modified	37%	70%	70%	70%	37%	60%
% of High Value Deer and Marten Habitat in Project Area That Remains Unharvested						
Deer (336 acres existing)	100%	100%	100%	100%	98%	99%
Marten (1395 acres existing)	100%	79%	82%	83%	80%	92%
Drainage Structures on Fish Streams	0	1	1	0	0	0
Volume Through North LTF (MMBF)	0	13.2	6.6	0	0	0
Volume Through West LTF (MMBF)	0	1.3	0	1.3	1.9	1.7
Volume to Barge (MMBF)	0	1.1	3.9	13.7	10.2	8.6

¹ Acres available vary by alternative due to alternative old-growth reserve placements.

² Proposed **treatment** acres are total acres (including reserves) within stands where harvest is proposed.

³ Proposed **harvest** acres are the acres that would actually be cut within stands where harvest is proposed.

⁴ ROW is Right-of-Way clearing for road construction (only in Alts. 2 and 3).

⁵ Productive Forest is forest land with at least 8000 board feet/acre or capable of growing 20 cubic feet of wood fiber per acre per year.

Chapter 1

Purpose and Need

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Chapter 1

Purpose and Need

Introduction: This Document and You

Thank you for your interest in the proposed Kuakan Timber Sale. This Environmental Impact Statement (EIS) was prepared by the Wrangell Ranger District of the Tongass National Forest to document our efforts to make decisions about a possible timber sale within the Kuakan Project Area based upon laws and other direction and upon public needs and concerns. The Assistant Forest Supervisor of the Petersburg Office, Tongass National Forest, will make the final decision, which will be documented in a Record of Decision.

This document outlines the effects of a proposed timber sale on Deer Island, known as the Kuakan Timber Sale. The Kuakan Project Area encompasses Deer Island, the unnamed islands along the western shore of Deer Island, and the Niblack Islands. In this document we describe the "proposed action" and four alternative strategies for harvesting timber as well as a "no action" alternative. Some of these strategies also include building and maintaining roads and log transfer facilities on Deer Island. We have disclosed the environmental effects and resource outputs that we expect from the proposed action and each of the alternatives.

This EIS is prepared according to the format and in compliance with established Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA) (40 CFR 1500-1508). In general, the objective is to furnish enough site-specific information to demonstrate a reasoned consideration of the environmental impacts of the alternatives and how these impacts can be mitigated.

The planning record is available at the Wrangell Ranger District office in Wrangell, Alaska. Other reference documents such as the Tongass Land and Resource Management Plan (Forest Plan), the Tongass Timber Reform Act, the Resources Planning Act, and the Alaska Regional Guide, are available at public libraries around the region as well as at the Supervisor's Offices in Petersburg, Ketchikan and Sitka.

Document Organization

Chapter 1 provides the purpose and need for the project we are proposing, the public issues surrounding the action, and other introductory information. It also discusses how the Kuakan Timber Sale relates to the Modified 1997 Forest Plan, the key issues driving the EIS analysis, and the authorities guiding the EIS process.

Chapter 2 describes and compares the proposed action, the alternatives for the project, including the No Action alternative, and summarizes the significant environmental consequences by issue. It includes summary information on the alternative environmental impacts, implementation and mitigation.

Chapter 3 describes the environment primarily in relation to the issues identified in Chapter 1 and predicts changes likely to occur with implementation of the alternatives. These changes include both direct and indirect impacts of the alternatives on the human and natural environment for each resource issue. Potential cumulative impacts of reasonably foreseeable or similar actions are also disclosed.

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Chapter 4 contains the list of preparers, EIS distribution list, glossary, index, and cited literature. The glossary will be especially useful to reviewers unfamiliar with technical terms or some of the more relevant laws regarding environmental analyses.

Finally, supportive information on units, roads, monitoring, mitigation measures, log transfer facilities, island analysis and how this sale fits in with the Tongass-wide timber sale program are included in the appendices. This EIS incorporates documented analysis by summarization and reference where appropriate.

Project Area

The Kuakan Timber Sale Project Area is located in Southeast Alaska on Deer Island, 35 miles south of the town of Wrangell, Alaska (see Figure 1-1). The project area is a group of islands bordered to the west by Ernest Sound, and to the east by Seward Passage. The project area includes all of Deer Island and the surrounding smaller islands, including the Niblack Islands to the west of Deer Island. These islands total approximately 9,555 acres and make up Value Comparison Unit (VCU) 525. All proposed activities are located on Deer Island which is approximately 8,329 acres in size. For analysis purposes, the project area boundaries are the same as the VCU boundaries.

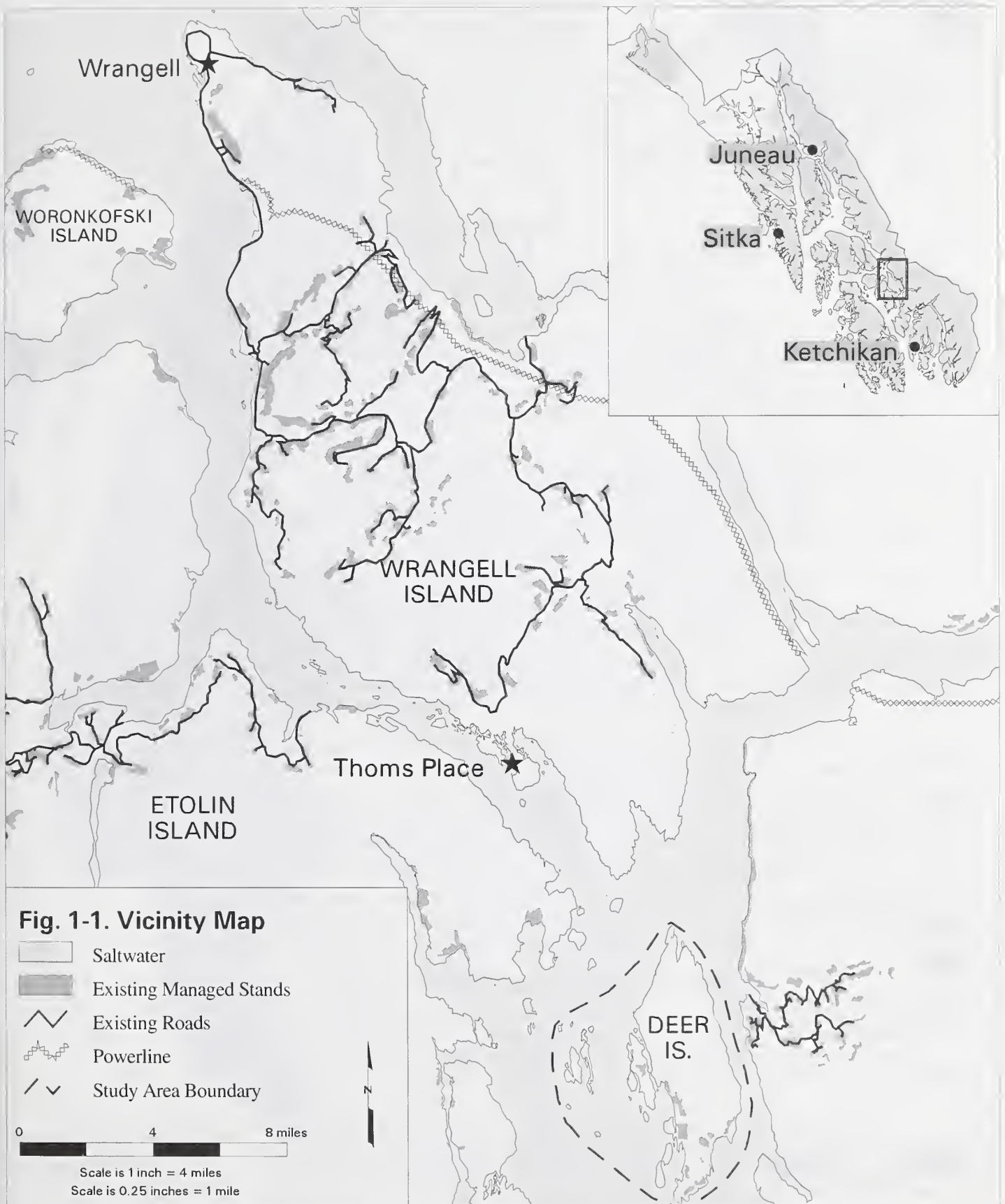
There are no roads in the Project Area at this time. Past timber management activity on Deer Island included 9 acres harvested by ground skidding on the western shore in the 1930's, and 456 acres harvested by helicopter principally along the south and west shorelines in 1989. In addition, much of the beach fringe was subject to light selective harvest in the early 1900's.

Proposed Action

What is meant by the "Proposed Action" - At the start of the project planning process we define a "proposed action". This serves as a starting point for the planning process and lets the public and other agencies know more about the project we are considering so they can comment. We then develop other alternatives to the proposed action in response to environmental issues, public concerns and comments from other agencies. The "proposed action" identified at the start of a project does not necessarily become the "preferred" or final "selected" alternative.

The initial proposed action for this project would harvest approximately 17 million board feet (MMBF) of timber on approximately 800 acres on Deer Island using a variety of harvest methods. A log transfer site would be constructed near the northeast tip of Deer Island. Approximately 9 miles of road would be constructed on the north and east sides of Deer Island. A variety of harvest methods would be used, which would leave various densities of trees in harvested areas. Both helicopter and cable yarding systems would be used. Approximately 85% of the volume would be yarded to and hauled over the road system, with the remaining 15% being yarded by helicopter directly to barges. The proposed action has been modified due to additional field information, and is represented in the EIS by Alternative 2, which proposes harvest on an estimated 689 acres with a projected output of approximately 15.6 million board feet of timber.

The alternatives evaluate the boundaries and location of the small old-growth reserve for possible adjustment for wildlife considerations, resulting in a proposed non-significant amendment to the Forest Plan to modify the old-growth reserve in VCU 525. Alternatives 2, 3 and 4 propose to add adjacent acres on Deer Island and the largest islands immediately west of the Forest Plan old-growth reserve, and modify the north boundary to follow features that are locatable on the ground. Alternatives 5 and 6 propose to change the location of the reserve to the northeast portion of Deer Island, the location that area biologists recommend for the old-growth reserve. Alternative 1 proposes no changes to the reserve. See the Biodiversity and Old-growth section in Chapter 3 for more detail on the old-growth reserve.



1 Purpose and Need

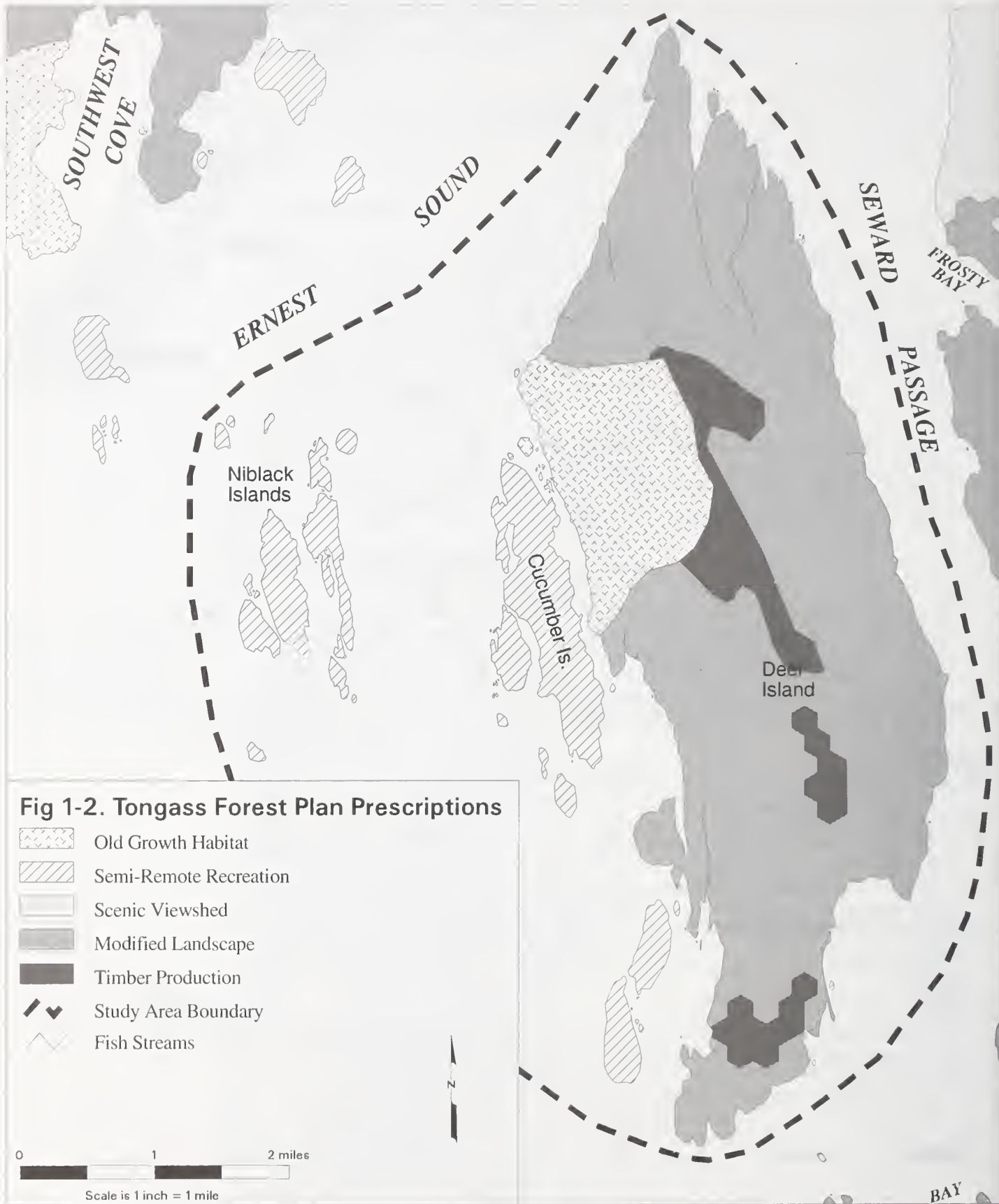








Fig 1-2. Tongass Forest Plan Prescriptions

-  Old Growth Habitat
-  Semi-Remote Recreation
-  Scenic Viewshed
-  Modified Landscape
-  Timber Production
-  Study Area Boundary
-  Fish Streams

0 1 2 miles
Scale is 1 inch = 1 mile

Decision to be Made

The Record of Decision for the Forest Plan established that timber harvest is appropriate in the Kuakan Project Area. The Tongass Assistant Forest Supervisor of the Petersburg Office will decide: 1) if, where, how and how much timber harvest should occur in the Kuakan Project Area at this time, and if so, 2) if and where road construction and log transfer facility development should occur to facilitate harvest and, 3) what mitigation measures and monitoring would be implemented. Decisions will be documented in the Record of Decision (ROD) for this project.

Purpose and Need

The purpose and need for the project is to respond to goals and objectives identified by the Forest Plan and to move the project area toward the desired future condition. The Forest Plan identified the following goals and objectives:

- (1) manage the timber resource for production of saw timber and other wood products from suitable timber lands made available for timber harvest; on an even-flow, long-term sustained yield basis and in an economically efficient manner (Forest Plan, page 2-4);
- (2) seek to provide a timber supply sufficient to meet the annual market demand for Tongass National Forest timber, and the demand for the planning cycle (Forest Plan, page 2-4);
- (3) to recognize the scenic values of suitable timber lands viewed from identified popular roads, trails, marine travel routes, recreation sites, bays, and anchorages, and to modify timber harvest practices accordingly (Forest Plan, page 3-135); and
- (4) maintain and promote industrial wood production from suitable timber lands, providing a continuous supply of wood to meet society's needs (Forest Plan, page 3-135 and 3-144).
- (5) provide a diversity of opportunities for resource uses that contribute to the local and regional economies of Southeast Alaska (Forest Plan, page 2-3).
- (6) support a wide range of natural-resource employment opportunities within Southeast Alaska communities (Forest Plan, page 2-3)
- (7) maintain a Forest-wide system of old-growth forest habitat to sustain old-growth associated species, and ensure that the reserve system meets the minimum size, spacing and composition criteria in Appendix K (Forest Plan, page 2-3).

The Kuakan Timber Sale would be designed to produce desired resource values, products, and conditions in ways that also sustain the diversity and productivity of ecosystems (Forest Plan, page 2-1).

The Kuakan Timber Sale is expected to provide between 10 to 15 million board feet of timber. The range of alternatives considered in this Environmental Impact Statement was determined during our analysis and reflects issues raised during scoping.

The Kuakan Timber Sale is included as part of the overall Tongass National Forest timber sale program. For a discussion on the reasons for scheduling the environmental analysis of the Kuakan Timber Sale Project, see Appendix E of this EIS.

Overall Direction for the Project

National Forest planning takes place at several levels: national, regional, forest, and project levels. The Kuakan EIS is a project-level analysis; its scope is confined to significant issues and possible environmental consequences of the project. It does not attempt to address decisions made at higher levels. It does, however, implement direction provided from those higher levels

The Forest Plan embodies the provisions of the National Forest Management Act, its implementing regulations, and other guiding documents. The Forest Plan sets forth in detail the direction for managing the land and resources of the Tongass National Forest. The Forest Plan is a result of extensive analysis, which is addressed in the Forest Plan FEIS and April

1 Purpose and Need

1999 Record of Decision. Where appropriate, the Kuakan EIS tiers to the Forest Plan FEIS, as encouraged by 40 CFR 1502.20. Also, this EIS will incorporate documented analyses by summarizing and citing them, rather than repeating the entire analysis.

The Forest Plan uses land use designations to guide management of the national forest lands within the Tongass. Each designation provides for a unique combination of activities, practices and uses. The Kuakan Project Area includes four land use designations. The goals of each are included below, and their locations are shown in Figure 1-2. The Forest Plan (Chapter 3) contains a detailed description of each land use designation.

Timber Production

The goals of this designation are to: 1) maintain and promote industrial wood production from suitable timber lands, providing a continuous supply of wood to meet society's needs; 2) manage these lands for sustained long-term timber yields; and 3) seek to provide a supply of timber from the Tongass National Forest which meets the annual and planning-cycle market demand, consistent with the standards and guidelines of this land use designation.

Modified Landscape

The goals of this designation repeat goals 1) and 3) under Timber Production, and include two others: provide a sustained yield of timber and a mix of resource activities while minimizing the visibility of developments in the foreground distance zone; and, recognize the scenic values of suitable timber lands viewed from identified popular roads, trails, marine travel routes, recreation sites, bays, and anchorages, and ... modify timber harvest practices accordingly.

Old-growth Habitat

The goals of this designation are: 1) maintain areas of old-growth forests and their associated natural ecological processes to provide habitat for old-growth associated resources; and, 2) manage early seral conifer stands to achieve old-growth forest characteristic structure and composition based upon site capability.

Semi-remote Recreation

The goals of this designation are: 1) to provide predominantly natural or natural-appearing settings for semi-primitive types of recreation and tourism; and, 2) to provide opportunities for a moderate degree of independence, closeness to nature, and self-reliance in environments requiring challenging motorized or non-motorized forms of transportation.

The Kuakan Project Area includes all of Value Comparison Unit (VCU) #525, and has Land Use Designations (LUD) of Timber Production (8%), Modified Landscape (67%) and Old-growth Habitat (12%) on Deer Island, and Semi-remote Recreation (13%) on all the smaller islands. The smaller islands west of Deer Island, including the Niblack Islands, are within the Project Area, but due to the Semi-remote Recreation LUD, there will be no timber harvest planned on these islands.

The following standards and guidelines delineate spatial areas not available for programmed timber harvest within land use designations that are otherwise available. Each applies to a specific habitat or ecological component. These areas are included within the Modified Landscape and Timber Production designations described above. More detailed information about these and other standards and guidelines can be found in Chapter 4 of the Forest Plan.

Beach and Estuary Fringe

The beach and estuary fringe is an area of approximately 1,000 feet inland from mean high tide around all marine coastline. Programmed timber harvest is not allowed and roads are located outside the fringe when possible.

Riparian

Riparian Management Areas are areas of special concern to fish, other aquatic resources, and wildlife. These areas are delineated according to the process group direction in the Riparian forest-wide standards and guidelines (Forest Plan, pp. 4-56 to 4-73). Some riparian boundaries may be adjusted after completion of a project-specific watershed analysis (Forest

Land Use Designations

Forest-wide Standards and Guidelines

Plan, p. 4-56 and Appendix J). Timber harvest is not scheduled in Riparian Management Areas.

Desired Future Condition

Chapter 3 of the Forest Plan describes the desired conditions for the various LUDs within the Kuakan Project Area.

For Timber Production, the desired future condition includes healthy tree stands in a balanced mix of age classes from young stands to trees of harvestable age, and a road system providing access for timber management as well as recreation, hunting and fishing, and other public uses. In a Modified Landscape, management activities in the visual foreground will be subordinate to the characteristic landscape, but may dominate the landscape in the middle and backgrounds. Within areas allocated to Old-growth Habitat, the desired condition is that all forested areas attain old-growth forest characteristics and provide a diversity of old-growth habitat types. Areas allocated to Semi-remote Recreation are characterized by generally unmodified natural environments where ecological processes and natural conditions are only minimally affected by past or current human uses or activities.

While planning a timber sale, or any other ground disturbing activity, we need to consider the desired future condition of the landscape, not just the timber resource. The following list is a sample of the desired conditions that we use in guiding our management of the Kuakan Project Area.

Desired Conditions of the Kuakan Project Area

Soil productivity will be maintained, while using the resources it produces.

- Harvest timber on lands that are not adversely affected by the management activities. For example: harvest timber where the slopes are not overly steep unless site-specific prescriptions indicate there is not a high risk of management-induced slope failure. Manage timber yarding to minimize disturbance of v-notch sideslopes.
- Locate, construct and maintain roads in ways that minimize environmental disturbance.

Roads and Access Management will be considered

- Plan transportation facilities that will efficiently integrate and achieve Forest Plan direction, including consideration of landscape-scale ecological objectives.
- During project planning, identify resource concerns and site specific mitigation measures. Clearly document these mitigation measures to facilitate project implementation and monitoring.

Aquatic and marine productivity will be maintained or enhanced

- Maintain fish habitat, stream bank and stream channel processes, large woody debris supply, water quality, and fish passage through crossing structures.
- Maintain balance between streamflow and sediment supplies to assure long term channel stability. Maintain streamflow regimes that support critical aquatic life stages.
- Protect State designated beneficial uses ("growth and propagation of fish, shellfish, other aquatic life and wildlife").
- Locate and carry out upland activities in a manner that reduces or eliminates potential adverse effects to marine productivity.

Biologically important habitats will continue to be represented in the Project Area, so a full spectrum of wildlife habitat needs is accounted for and landscape biodiversity is maintained.

- Follow Forest Plan direction to maintain the long-term viability of wildlife populations by managing the size and shape of forest blocks, travel corridors between forest blocks and migration pathways.
- Maintain remnant patches of "old growth" in or adjacent to harvest areas to provide a seed source to eventually recolonize areas where forbs and shrubs have been shaded out by dense second growth.

The existing condition of the Project Area is described in Chapter 3 of this EIS, in the "Affected Environment" of each resource section.

1 Purpose and Need

- Maintain subsistence resources by managing habitats and landscapes for game populations and by controlling access through minimizing road building and through road management.

Visual quality will be maintained along the visual priority travel routes from Ketchikan to Anan Wildlife Observatory.

- Meet or exceed the Visual Quality Objective (VQO) of Modification in all areas seen from Visual Priority Routes.

The desired conditions described by the Forest Plan provide a basis for management of the Kuakan Project Area. Management activities will also be influenced by Forest Plan standards and guidelines and circumstances particular to the project area, and will help move the area toward the desired future conditions of the land use designations.

Public Involvement

When a timber sale project begins, we designate a group of individuals with a variety of educational backgrounds to a team known as an "interdisciplinary team" or IDT. The Kuakan IDT listened to public comment and worked with you and the various State and Federal agencies in an effort to plan the best possible project. The team conducted the planning process and wrote this document to inform you and the Forest Supervisor of the environmental consequences of the proposed action and alternatives.

"Public Scoping" is the term we use to describe the process of identifying the significant issues for a project by contacting interested individuals and agencies to determine their concerns, help identify public issues and obtain public comment at various stages of the process. The following is a summary of the letters, contacts, and meetings that have taken place to date during the planning of this project:

- December 1997 - Preliminary Scoping Letter to identify issues.
- Winter/Spring 1998 - Newspaper articles and notes describing the project and opportunities for comment.
- July 1998 - Notice of Intent published in the *Federal Register*.
- November 1998 - Scoping Letter sent to clarify issues and identify alternatives.
- November 1998 - Public open house was held.
- February 1999 - Meeting with Wrangell Cooperative Association, federally recognized tribal government.
- Ongoing dialog and on-the-ground meetings with ADF&G and USF&WS.
- Availability of the Draft Environmental Impact Statement (DEIS) was published in the *Federal Register* on July 9, 1999, and through notices in local papers. These notices started a 45-day comment period. Copies of the DEIS were sent to interested people on the Kuakan mailing list.

Several other agencies review this project to provide their professional point of view on topics in which they have expertise. In some cases, reviews are necessary because another agency has authority to issue permits for a specific activity we propose. Below, we describe our relationship to other agencies in the planning of this project.

US Army Corps of Engineers - The Corps is responsible for approving proposals to dredge or fill materials in the coastal waters of the United States under Section 404 of the Clean Water Act. In this project, we seek a permit from the Corps for Log Transfer Facilities. The Corps also has administrative authority over activities associated with wetlands. Any road construction in wetlands is of interest to the Corps and we must consider and reduce our effects on those areas. All roads proposed for this project are for the purpose of managing the timber resource.

Public Scoping

Draft EIS

Agency Involvement - Permits, Licenses, and Certifications

US Environmental Protection Agency - The EPA provides a general review in accordance with their responsibilities under the National Environmental Policy Act, Section 309 of the Clean Air Act, and Section 402 of the Clean Water Act. They also administer permits associated with the Log Transfer Facilities under the National Pollution Discharge Elimination System.

US Coast Guard - A Coast Guard Bridge Permit (in accordance with the General Bridge Act of 1946) is required for all structures constructed across navigable waters of the United States.

US National Marine Fisheries Service - NMFS has authority for threatened or endangered marine life and we consulted with them on possible effects on those species.

US Fish and Wildlife Service - USF&WS administers the Endangered Species Act. We consult with the USF&WS to determine if we are affecting Threatened or Endangered species. We also discuss effects on other wildlife species with the USF&WS, since they have expertise in many areas and are interested in managing for wildlife in ways that will prevent the need for listing species as Threatened or Endangered in the future. The US&FWS also conducted dive surveys of potential log transfer facilities and offered recommendations on suitable sites.

State of Alaska - Five departments in the State of Alaska are asked to participate in the planning of this project. They give general comments and suggestions as well as specific reviews. These departments include:

- 1) **Division of Governmental Coordination** - DGC provides overall coordination for the State's comments and administers the Alaska Coastal Management Program (ACMP), which requires the Forest Service to design activities to be compatible with approved State management guidelines.
- 2) **Department of Environmental Conservation** - DEC participates in cooperative water quality management through Section 319 of the Clean Water Act and a Memorandum of Agreement with the Forest Service. They also issue a certificate of compliance with Alaska Water Quality Standards under Section 401 of the Clean Water Act.
- 3) **Department of Fish and Game** - ADF&G is Involved in the Coastal Zone Consistency review and are especially interested in instream activities and other fish, water, wildlife and subsistence issues.
- 4) **Department of Natural Resources** - DNR issues tideland permits and any lease or easement necessary for the log transfer site.
- 5) **State Historic Preservation Office** - SHPO determines compliance with Section 106 of the National Historic Preservation Act, a process to determine the effects of alternatives on heritage resources.

Wrangell Cooperative Association - The Wrangell Cooperative Association is a federally recognized tribal government, and we consult with them on possible cultural resource impacts as well as other resource impacts from the project.

Field Studies

Field studies were conducted in 1997 and 1998 to collect specific information relative to issues and to verify resource information contained in the Tongass National Forest geographic information system (GIS). Examples of resource information in GIS include streams, important wildlife habitat, timber and soil inventories, and location of proposed harvest units. Field studies used unit and road design cards for all action alternatives to document the location of proposed harvest units and roads. Resource specialists listed specific concerns on the cards and recommended how those concerns should be addressed or mitigated (Appendices A and B).

1 Purpose and Need

Information from field studies and GIS was then used to address the issues and analyze the environmental effects of each alternative. The entire analysis was used by the Forest Service to select a preferred alternative for publication in the Draft EIS.

Issues

Significant issues for the Kuakan Project were identified through public and internal scoping. Similar issues were combined into one statement where appropriate. The following four issues were determined to be significant and within the scope of the project decision. These issues are addressed through the proposed action and other alternatives. Chapter 3 includes discussion of other concerns that were not considered significant in relation to the Kuakan project, but are taken into consideration during alternative development and decision making.

Issue 1: Scenic, Recreation and Tourism Values

People are concerned about how this sale will change the scenic conditions, and recreation and tourism potential in the Deer Island area.

This area is used by local people from Wrangell, Thoms Place, Coffman Cove and Meyers Chuck for recreation. A large portion of recreationists affected by this sale will be tourists who are traveling through Alaska's Inside Passage. Deer Island is on a main travel route between Ketchikan and the Anan Wildlife Observatory, which receives approximately 2500 visitors annually. The State of Alaska is proposing some changes in the transportation network for Southeast Alaska which includes possible development of a new short-hop ferry system that would use Seward Passage on a daily basis, passing along the eastern shore of Deer Island.

Different people will perceive any impacts from a sale in this area in different ways. It is not possible to say that any given change will have a net positive or negative effect on recreationists in the area. It will depend on whom we ask. For example, a recreationist who values the addition of roads to previously inaccessible areas will see proposed road building as a definite advantage over no harvest or helicopter yarding. Conversely, a recreationist who values the appearance of an undisturbed natural setting while boating or fishing may be able to support helicopter yarding or no harvest, but he/she will definitely perceive a roaded entry with visible clearcutting as a negative impact on his recreation experience. Therefore, the best way we can display the differences between the alternatives being proposed is to lay out the expected changes in the scenic conditions and recreational potential in an objective manner, and let the recreationists reading the EIS decide if they view these changes as inherently positive or negative.

You can read more about this issue in the Recreation and Scenery sections of Chapter 3. The discussions in Chapter 3 focus on the following areas:

- 1) **Scenery** - How will the area look to people who are boating past? Will the harvest units dominate the landscape, or will they blend in enough to be barely noticeable to the casual observer?
- 2) **Post sale road management strategies and recreation potential** - How would the proposed management for the road systems (if any are constructed) affect potential recreational users of the area? What type of recreational activities would be favored by the different alternatives?
- 3) **Direct effects to recreationists, tourists, fishermen, and outfitters and guides** - The Ernest Sound/Seward Passage area is traveled in the summer months by independent boaters traveling the Inside Passage and by local users and outfitter/guides transporting clients to the Anan Wildlife Observatory. Additionally, the area is used by charter boats for salmon and halibut fishing. How would the actual road building, logging, and presence of logging camps, barges, and log rafts along the coastline affect these users?

Issues Associated with the Proposed Action

"... Harvest may affect views from kayaks, small boats, ferries and cruise ships..."

"... The boat traffic to and from the Bradfield, Zimovia, and Anan, which includes locals, an ever increasing number of visitors, charter and private, and an occasional ferry, certainly don't come to these parts to look at clearcuts ..."

"... Your forest practices should not mean large vast clearcuts, but responsible management ..."

"...Ernest Sound is beautiful, almost untouched wilderness that should remain that way..."

"... Tourists like us who have enjoyed Alaska for it's wilderness quality and it's wildlife won't spend huge amounts of money to see stumps and mudslides ..."

"...The full economic effects of this sale, including those effects on tourism, must be evaluated..."

Issue 2: Timber Supply and Economics

"...We are in support of any effort that makes timber available to the Southeast Alaska timber and supporting industries..."

"...A harvest level of 17 mmbf on such a small island almost assures large clearcuts with their familiar bad results..."

"...While it is possible to do many different types of logging, depending on site specific conditions, it is not always economically feasible to consider many of them..."

This issue relates to the economic viability of proposed timber sales, and the potential employment and revenues generated by the project.

This project has the potential to affect employment and the economy of local communities. Public comments indicate concern about current changes in the timber industry, particularly regarding the utility products from this sale and questions about the need for the sale given the recent mill closures. The amount of wood harvested, the location of the old-growth reserve and any infrastructure developed with this entry may affect availability and costs associated with future entries for timber harvest. Roads and log transfer facilities constructed for timber harvest may make future sales more economical, but the access they provide between sales is a concern due to other issues, such as increased hunting and other disturbances.

The shape of the island and distance to saltwater may make helicopter yarding feasible for both short term and long term timber management.

You can read more about this issue in the Silviculture and Timber, and the Socioeconomic sections of Chapter 3.

Issue 3: Biodiversity and Wildlife Species of Concern

"...We are concerned that a timber harvest is being proposed on an island this small and that the only OGR on the island is a small one, located on a very steep hazardous soils slope..."

"...Wildlife would benefit from low volume non-clearcut logging methods..."

"...The DEIS needs to address impacts to Alexander Archipelago Wolf, Queen Charlotte Goshawk, and endemic terrestrial mammals..."

"...Goshawks, deer, eagle nests, fisheries and biodiversity are important, but the old Standards and Guidelines were more than adequate to protect these species..."

Timber management on a relatively small island such as Deer Island raises concerns for wildlife populations within the project area.

The impacts of timber harvesting on wildlife become magnified due to the small, isolated nature of Deer Island. Unlike what may occur on larger islands or the mainland, many species cannot easily move or shift locations if we reduce the quality of habitat within the project area. Small mammals (endemic or otherwise) are limited in their ability to disperse and have been identified as a concern on this island. The amount of structure left within units and the spacing of units can effect small mammal populations. Larger species such as the Sitka black-tailed deer can disperse more easily but cumulative impacts to deer winter range on the island may effect subsistence harvesting over time. As with small mammals, the impacts to deer winter range habitats will vary by the amount of structure left within harvest units and their location. We have identified important habitat for two key wildlife species -- the Northern goshawk and the Alexander Archipelago wolf. Even though viability for these species is addressed in the Forest Plan, we will consider the effects on island habitats and evaluate old-growth reserve options with regard to these species.

The location and habitat quality of the small reserve is an important issue in the design of this timber sale. Old-growth reserves and corridors are included in the Forest Plan as a strategy for maintaining biodiversity and viable wildlife populations. The Forest Plan directs us to conduct an analysis of small reserves at the project level.

The location, density, and use of roads has an effect on the quality of wildlife habitat for certain species. Roads can act as a dispersal barrier to small mammal populations. Roads on Deer Island could provide interior access to game animals that currently are only reached by shore. Road access has been identified as an issue for small mammals, marten, wolves and other game species.

You can read more about this issue in the Biodiversity and Old-growth, Threatened and Endangered Species, and Wildlife sections of Chapter 3.

1 Purpose and Need

Issue 4: Roads and Access Management

"...Opening up the area with roads will not only make the sales more economical but will allow more and greater opportunities for hunting, camping, and other forms of recreation ..."

"...Logging roads have proven to be one of the worst environmental impacts associated with logging operations ..."

"... if it must be logged, helicopter logging using alternative cutting could avoid these hazards ..."

Deer Island is currently unroaded. Most of Deer Island is included in the Frosty Bay Roadless Area (210) as shown on the Forest Plan Roadless Area Map and discussed in Appendix C of the Forest Plan FEIS (page C-22). Building roads in previously unroaded areas is of national concern, in addition to being a local issue. According to the Record of Decision for the Forest Plan, 90% of all currently unroaded lands on the Tongass National Forest will still be roadless at the time of the next Forest Plan Revision (USDA, 1997b).

For some people, new roads offer opportunities to access areas for outdoor recreation and subsistence uses that were previously unavailable, or difficult to get to. Others see roads as a detriment, providing increased competition for subsistence resources and taking away areas that they have used for remote recreation. Roads may provide an economical means to manage timber resources over time. Determining economic advantage of a road vs. helicopter is complex. Roads require a large initial investment and maintenance over time, but cost is reduced for future timber management. Helicopters require a high cost with each entry over time. The shape of Deer Island and distance to saltwater may make helicopter yarding feasible for both short and long term timber management.

Road construction and LTF development present difficult challenges on Deer Island. The topography of Deer Island requires that at least two non-connecting road systems be constructed to access "cable ground". Previous timber management focused on the south end of the island, where road construction costs were considered "normal" for southeast Alaska, deferring timber management on the north and east side because of construction difficulties. The 6 miles of roads planned for the south end of Deer Island were never built. Full road access on the east side of the island will require building road across an old landslide tract on 65-75% slopes. There is a risk of road construction related landslides affecting scenery, water quality and soil productivity.

There is also a concern about how roads, if built, should be managed during the years between harvest entries. Road construction, maintenance and access management are integral parts of the other key issues. Each of the key issues discussed in the EIS will have a section dealing with roads and access management.

Project-level planning includes road management objectives that address local consideration for whether or not access is encouraged, restricted, or prohibited for any given road. Site specific information concerning potential roads associated with this project is included in the Road Cards in Appendix B.

You can read more about this issue in the Transportation section, as well as almost all the other sections of Chapter 3. Appendix D contains additional information specific to log transfer facility development.

Other Environmental Considerations

In addition to the "key issues," there are other concerns that were brought up by the public or must be disclosed by law. The possible impacts to these resources is also disclosed in Chapter 3. Although these other concerns are not considered "key issues," some are connected to the key issues and all of them are considered in our analysis. These other concerns include:

- Subsistence
- Forest Soils
- Wetlands
- Fisheries, Watersheds and Marine Resources
- Heritage Resources
- Air Quality
- Effects on Consumers, Civil Rights and Women

Legislation and Executive Orders Related to This EIS

Shown below is a brief list of laws pertaining to project-specific planning and environmental analysis on Federal lands. Some of these laws are specific to Alaska, while others pertain to all Federal lands.

- Multiple Use Sustained Yield Act of 1960
- National Historic Preservation Act of 1966 (as amended)
- Wild and Scenic Rivers Act of 1968, amended 1986
- National Environmental Policy Act (NEPA) of 1969 (as amended)
- Clean Air Act of 1970 (as amended)
- Alaska Native Claims Settlement Act (ANCSA) of 1971
- Marine Mammal Protection Act of 1972
- Endangered Species Act (ESA) of 1973 (as amended)
- Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974 (as amended)
- National Forest Management Act (NFMA) of 1976 (as amended)
- Clean Water Act of 1977 (as amended)
- American Indian Religious Freedom Act of 1978
- Alaska National Interest Lands Conservation Act (ANILCA) of 1980
- Archeological Resources Protection Act of 1980
- Cave Resource Protection Act of 1988
- Tongass Timber Reform Act (TTRA) of 1990
- Magnuson-Stevens Fishery Conservation and Management Act of 1996
- Executive Order 11888 (floodplains)
- Executive Order 11990 (wetlands)
- Executive Order 11593 (heritage)
- Executive Order 12898 (environmental justice)
- Executive Order 12962 (aquatic systems and recreational fisheries)

In addition, the Coastal Zone Management Act (CZMA) of 1976, as amended, pertains to the preparation of an EIS. Federal lands are not included in the definition of the coastal zone as prescribed in the CZMA. However, the Act requires that when Federal agencies conduct activities or development that affect the Coastal Zone, that agency's activities or development be consistent to the maximum extent practicable with the approved State Coastal Management Program. This determination is made by the USDA Forest Service.

The Alaska Coastal Management Plan incorporated the Alaska Forest Resources and Practices Act of 1979 as applied standards and guidelines for timber harvesting and processing. The Forest Service Standards and Guidelines and Mitigation Measures described in Chapter 2 and 3 of this document are equal to or exceed State Standards.

1 Purpose and Need

A Civil Rights Impact Analysis (CRIA) is included as part of this EIS. The purpose of the CRIA is to identify any possible impacts associated with this proposed project based on an individuals civil rights (race, color, national origin, age, religion, gender, disability, political beliefs, sexual orientation, marital or family status). This analysis tiers to the Economic and Social Environment analysis included in Chapter 3 of the Forest Plan FEIS (USDA Forest Service, 1997b).

Availability of the Planning Record

An important consideration in preparation of this EIS has been reduction of paperwork as specified in 40 CFR 1500.4. In general, the objective is to furnish enough site-specific information to demonstrate a reasoned consideration of the environmental impacts of the alternatives and how these impacts can be mitigated.

The planning record is a comprehensive project file documenting the process of developing this EIS, and is located at the Wrangell Ranger District office in Wrangell, Alaska. Other reference documents such as the Forest Plan, the Tongass Timber Reform Act, the Resources Planning Act, and the Alaska Regional Guide are available at public libraries around the region as well as at the Assistant Forest Supervisor's Office in Petersburg, Ketchikan, and Sitka. The Forest Plan is also available on the internet and CD-ROM.

Chapter 2

Alternatives

Introduction

Landscape Analysis

Existing Condition Overview

Alternative Development

Items Common to All Alternatives

Alternatives Considered in Detail

Mitigation Measures

Road Mitigation Measures

Common to Alternatives 2 and 3

Monitoring

Alternative Comparison by Issue

Chapter 2

Alternatives

Introduction

In this chapter we describe and compare the alternatives we considered for the Kuakan Project. We include a discussion of how alternatives were developed, mitigation measures, monitoring and other features common to all alternatives, a description and map of each alternative considered in detail, and a comparison of these alternatives focusing on the significant issues. This chapter presents the alternatives in comparative form, sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public (40 CFR 1502.14).

Some of the information in this chapter is summarized from Chapter 3, "Affected Environment and Environmental Consequences." For a full understanding of the effects of the alternatives, readers will need to consult Chapter 3.

Landscape Analysis

We divided the project area into six landscape blocks based on physical characteristics that seemed to make logical breaks. A more complete discussion of this analysis is included in Appendix F. Within the landscape blocks, we looked at landforms, disturbance factors, past activity, and possible management prescriptions and developed a full-rotation management scenario for each landscape block. Then we combined the scenarios together to come up with an island-wide management schedule. As a team, we chose two basic approaches to managing the island over time. One approach is to use a "heavy but less frequent entry" scenario, where individual entries would harvest about 20-25% of the available timber, with a fairly long time between entries. A second approach is to use a "lighter but more frequent entry" scenario, where each entry would harvest about 10-15% of the available timber, with a shorter time between entries. For example, given a 1000 acre block of suitable forest to be managed on a 100 year rotation, the "heavy but less frequent" scenario might propose harvest of 250 acres every 25 years. The same area could be managed on a "light but more frequent" basis by scheduling 100 acres to be harvested every 10 years. As you read further, you will notice that Alternatives 2 and 4 are based somewhat on the "heavy, less frequent" scenario, while Alternatives 3 and 6 are more in line with the "light, more frequent" scenario. Alternative 5 takes a different approach, treating the landscape by selectively removing 25% to 35% of the trees within large blocks of land. Alternative 1 proposes no development or timber harvest at this time.

Existing Condition Overview

Chapter 3 contains more detailed information on the existing condition of the islands included in the project area. This section is intended to give the reader a sense of what the area is currently like, and what past management activities have taken place.

The Kuakan project area is all of VCU 525. It includes Deer Island and its adjacent small islands, plus the Niblack Islands. The Niblack Islands are a group of small islands in the middle of Ernest Sound, between Deer and Etolin Islands. The Niblack Islands in combination with the island complex west of Deer Island total approximately 1245 acres. Cucumber Island, the largest island immediately west of Deer Island, is 520 acres, while the other islands range in size from a few acres to 200 acres. These small islands are characterized by rocky shorelines with numerous shoaling rocks nearby. Most of the islands are two to three times longer than their width, having a general north/south orientation. The larger islands rise to an elevation of about 300 feet above sea level. Deer Island is approximately 8330 acres, it is two miles wide by about 8 miles long, and is oriented in a north/south direction. The island rises from sea level to an elevation of about 2,550 feet (see Soils and Geology in Chapter 3).

The vegetation in the project area is typical of the coastal rainforest of southeast Alaska. It is composed of a complex of coniferous forest mixed with bogs and sub-alpine muskeg vegetation (see Silviculture and Timber in Chapter 3). One key difference on Deer Island, compared to the rest of southeast, is the higher percentage of western red cedar and Alaska yellow cedar that is present. A typical species mix for the islands around Wrangell would be 70% western hemlock, 23% Sitka spruce and 7% red and yellow cedar combined. Stand examinations on Deer Island indicate there is 51% western hemlock, 8% Sitka spruce, 20% western red cedar and 21% yellow cedar.

Deer Island itself is not considered an important producer of commercial, sport, or subsistence fish species. However, the marine waters surrounding Deer Island provide commercial fisheries for several species; most notably shrimp, crab, and salmon (see Fish in Chapter 3).

As its name implies, Deer Island is home to Sitka black-tailed deer. Many other wildlife species live on the islands as well, including brown bear, wolf, squirrel, marten and mink. We have not confirmed the presence of moose or elk, but the proximity of this island to Etolin Island and the mainland would make it relatively easy for either of these strong swimmers to show up on Deer Island. Deer Island is quite possibly a stepping stone of sorts for animal movements between the mainland and Etolin Island, and beyond (see Wildlife in Chapter 3).

All of Southeast Alaska, including the islands in the Kuakan project area, has been used by indigenous people of Southeast Alaska for many centuries as a source of subsistence resources (see Heritage Resources in Chapter 3). While there are no documented historic or pre-historic village sites on Deer Island, the island was used for hunting and gathering. The island has an abundance of both red and yellow cedar which provide a source for traditional cedar bark, planking, canoes and totem poles. Many cedar trees along the beaches show evidence of past use or testing. A small number of people still collect cedar bark from trees on Deer Island for use in basketry. Most bark strippers find suitable trees within 300 feet of the beach.

Much of the beach fringe throughout southeast was selectively hand-logged in the late 1800's and early 1900's to provide lumber for homes, float logs for fish traps, crates for fish packing plants and high-grade spruce for airplane construction. Deer Island was no exception, and the steep shorelines made it a desirable site for hand-logging. Most hand-logging was done within 500 feet of the shoreline.

The island is also a source of "free-use" timber for people living in the vicinity. Residents of Alaska are eligible for up to 10 thousand board feet of timber per year from the national forest for personal use. The natural durability of cedars make them desirable for many uses, and the abundance of cedar on Deer Island attract an average of 1 free-use permittee each year. Since

Historic Use

Current Use

1993, 5 permits have been issued and 28 thousand board feet of free-use timber has been cut and removed from Deer Island. Almost all free-use timber is cut within 200 feet of the beach.

The waters around Deer Island provide numerous fishing opportunities. There are commercial seasons for crab, shrimp, salmon, halibut and sea cucumbers. The area is also used for sport and subsistence fishing for these same species as well as charter fishing for salmon and halibut.

Hunting, both sport and subsistence, takes place on Deer Island. The reported success rate is relatively low, with an average of 2 deer harvested per year from the Deer Island area over a ten year period from 1987 to 1997 (see Subsistence section in Chapter 3).

The small bay on the north tip of Deer Island and some of the bays and inlets on the west side of the island can provide adequate protection for use as short term anchorages, depending on wind and water conditions. The Forest Service maintains a recreation rental cabin in Frosty Bay, approximately 1.5 miles east of Deer Island, on the mainland.

We have no records of uplands use by commercial guides or outfitters in the Kuakan project area. Current uses on the islands appear to be primarily for deer hunting, bark gathering and free-use timber harvesting.

There is one special use permit in the project area, for a recreation use cabin in the Niblack Islands. There is also a float house moored in the channel that separates Deer Island from Cucumber Island.

The first harvest that we have record of was a 9 acre clearcut unit located on the western shore of Deer Island. The unit was harvested in the early 1930's, and the logs were apparently skidded directly to the water. The stand has regenerated to a mix of coniferous species with alder adjacent to the stream channels. No recent stand exam data has been gathered for this unit, but the stand appears to be growing well, with a relatively open understory.

In 1977, the Deer Island Unit Management Plan was developed. The plan culminated in a timber sale that proposed to harvest approximately 11 million board feet from 456 acres with a combination of A-frame and high-lead logging. Six miles of road and two LTFs were planned.

Harvest began on the Deer Island Timber Sale in 1988. The timber operator, running short on contract time, requested and was granted permission to helicopter log the entire sale. As a result, no roads have been built on Deer Island. One log transfer facility (LTF) was constructed in the southwest portion of Deer Island, called the Deer Island West LTF. This LTF was used as a helicopter fueling site, for landing logs from nearby units, for bundling and transferring logs into rafts, and for de-watering logs from other units for bundling. Logs from most of the units were helicopter yarded to boom bags, for towing to the LTF. Boom bags are composed of a series of logs chained together end-to-end, then wrapped in a circle to contain loose logs within the hoop that was formed.

The Deer Island West LTF was decommissioned as part of the closure of the Deer Island Timber Sale. The rock ramp that had been used for taking logs out of the water and putting bundles into the water was removed, and the upland area was bladed to restore a natural slope. The wood residue that had accumulated from handling logs was spread over the area and seeded with grass and clover. Spruce seedlings were also planted. A 1997 monitoring SCUBA dive survey showed bark accumulation at the site is well within permit standards for LTFs (see MARINE section in Chapter 3 of this EIS). The Forest Service has applied to renew permits for use of the Deer Island West LTF. All alternatives under consideration in this EIS would allow an operator the opportunity to redevelop the LTF.

As noted in Chapter 1, the 1997 Forest Plan allocated the Deer Island VCU to several management prescriptions, including Semi-remote Recreation (all islands smaller than 1000 acres), Old-growth Habitat, Modified Landscape and Timber Production. Semi-remote Recreation is a non-development LUD, therefore, no commercial timber harvest will take place on the islands around Deer Island, within VCU 525.

Past Timber Harvest

No Roads exist on Deer Island

Deer Island West LTF

No Timber Harvest on Small Islands

2 Alternatives

Current OGR is Undersized

Development is also not allowed within the Old-growth Habitat LUD. The current old-growth allocation is approximately 385 acres too small to meet TLMP guidelines of 16% of the VCU acreage (see the Biodiversity and Old-growth section of Chapter 3). Appendix K of the Forest Plan contains the Old-growth Reserve Habitat Criteria. All action alternatives propose modification or relocation of the reserve in VCU 525.

Alternative Development

The Interdisciplinary Team (IDT) used information from the analysis of public scoping comments, in conjunction with field verified resource information to formulate different alternative approaches to managing the resources in the project area. Each alternative represents a site-specific proposal developed through intensive IDT evaluation. Unit identification and design made additional use of aerial photographs, topographic maps and a large source of Geographic Information System (GIS) data.

The proposed action is one of many possible approaches to harvesting timber in the Kuakan Project Area. This chapter describes four other action alternatives being considered, plus the "no action" alternative. These other alternatives were developed to address the Purpose and Need for the project; to meet Forest Plan standards and guidelines (USDA Forest Service, 1997b) and applicable laws; and to respond to the key issues that were identified during our public involvement process. All of the alternatives were designed to address the key issues and desired conditions for the Project Area to some degree; however the emphasis placed on a given key issue or desired condition will vary between alternatives.

Early in the project planning process, the question arose of whether or not to propose construction of a road for timber management on Deer Island, since all of the island is accessible by helicopter. It was decided that since a road is feasible to construct on the island, and it is suspected that this would be the most economical method for timber harvest, a road would be considered. Based on an initial logging system analysis, 9 miles of road with an LTF at the north end of the island and harvest of 17 million board feet of timber was published as a proposed action for this project. Since that time, a difficult section of ground for road construction has been identified. The road would cross 300-400 feet of steep ground with slopes of 65-75%. The slope is continuous for a long distance, both upslope and down in this area. Throughout this document and in our resource reports this area is referred to as "the switchbacks." The location of the switchbacks is identified on the road card (Appendix B, Road 6700) and on the map for Alternative 2 (Figure 2-2) in this chapter. There is also more discussion of this critical spot in the Soils and Transportation sections of Chapter 3. Alternative 2 is the only alternative that proposes construction of this segment of road.

The Switchbacks

Alternatives Considered, but Eliminated From Further Review

Cable Yarding Only Alternative

We considered an alternative that would only harvest units accessible by roads for cable yarding. The theme of this alternative was to emphasize logging economics by designing a sale that would not require helicopter yarding, which is assumed to reduce the benefit/cost ratio for timber harvesting. Such an alternative would greatly limit our ability to meet the desired condition of leaving varying densities of trees to create multi-structured stands, as well as the desire to manage for timber production on land that is in the available base, but not accessible by road. Therefore, this alternative was eliminated from detailed study.

Southern Old Growth Reserve Option

We considered an alternative that would have moved the Deer Island small Old-growth Reserve to the southern part of the island. The theme of this alternative would have been to emphasize protection of high value deer winter habitat on south facing slopes. Based on field visits and protection of high value deer habitat in the beach fringe, the northeast reserve was determined to be a better option for wildlife (see Biodiversity section in Chapter 3). There is also known use by goshawks (two nest sites) and wolves in the northeast site. Therefore, this alternative was eliminated from detailed study.

Items Common to All Alternatives

Forest Plan Consistency

The alternatives incorporate all applicable management direction from the Forest Plan and are fully consistent with its goals, objectives, Forest-wide Standards and Guidelines, and management area prescriptions as they apply to the project area.

Best Management Practices

Best Management Practices (BMPs) are practices and operating procedures designed to protect water quality and wetlands. The BMPs are the result of extensive efforts between the Forest Service and the State of Alaska to identify practices that will ensure that timber harvest activities minimize soil erosion and protect aquatic habitat. BMPs would be applied in road location, design, and construction as well as in timber harvest units. The unit and road cards (Appendices A and B) and the log transfer facility design information (Appendix D) describe site specific application of BMPs.

High Hazard Soils

Slopes greater than 72 percent are generally considered to have a high risk for management induced mass wasting, and are therefore avoided in harvest units proposed in all alternatives. Some units may contain short pitches greater than 72 percent if they are minor inclusions within a unit and have been determined to be stable and suitable for harvest. To comply with Forest Plan standards, a "slope stability assessment" is completed for all units that contain areas with slopes steeper than 72 percent. Our GIS database indicates the following units may contain slopes in excess of 72 percent; 1, 3, 4a, 18a, 19a, 25, 33, 35, and 36.

Reconstruction of Log Transfer Facilities (LTFs)

All action alternatives would allow for reconstruction and use of the existing Deer Island West LTF. This LTF was originally constructed and used as a sort yard and LTF in conjunction with the Deer Island Timber Sale in 1989. The rock ramp and bulkhead were removed and the area was seeded with grass as part of the closure of the timber sale.

It is possible that the Frosty Bay LTF could be re-opened for use as a sort yard and log bundling yard for logs that have been helicopter yarded to barges. A possible scenario would have logs flown to barges from units along the eastern side of Deer Island. The barges could then be towed to Frosty Bay, the logs off-loaded at the LTF for further limbing and sorting, and then either loaded back on barges or placed into log rafts for towing to a mill.

The Forest Service is in the process of updating existing permits for both the Deer Island West and Frosty Bay LTFs for continued or future use as Log Transfer Facilities.

Transferring Logs to Saltwater

To address the concern of logging debris interfering with commercial fishing operations in the area, we would attempt to minimize the introduction of limbs and other debris into the ocean. Helicopters would yard logs to land or barges - no logs would be dropped directly from helicopters into saltwater. No logs would be placed in the water at the proposed Deer Island North LTF. We would allow logs to be bundled and placed in saltwater at the existing Deer Island West LTF, or at the Frosty Bay LTF, to create rafts for transport.

Logging Camp and Facilities

No land-based logging camp will be authorized for this timber sale. The purchaser would most likely use a floating camp, which would be subject to State and Federal permits. If an alternative with roads is selected, there may be some minor land-based facilities, such as a repair shop for trucks and other equipment, and storage facilities for fuel/lubricant or road building explosives. No garbage pits or dumps will be allowed in the project area.

Heritage Resources

Archeological surveys do not indicate that any known sites would be affected by the alternatives as currently designed. If heritage resources are found prior to or during the

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timber sale, appropriate mitigation and protection would be designed in consultation with the Alaska State Historic Preservation Officer.

Harvest Prescriptions

Appendix G of the Forest Plan FEIS (USDA 1997b) contains information on silvicultural systems used on the Tongass. The appendix classifies the various prescriptions into three basic regeneration methods; even-aged, two-aged and uneven-aged. **Even-aged methods** include clearcutting with less than 10% reserves or cutting patches larger than 2 acres.

Two-aged methods include clearcuts with more than 10% reserves or overstory removal with reserves. **Uneven-aged methods** include group selection and single tree selection.

Almost all harvest prescriptions proposed for the Kuakan project would require retaining some trees in clumps or dispersed through all or a portion of harvest units to maintain visual quality objectives and biodiversity. If large enough, reserve clumps would help meet the desire to provide seed sources to eventually recolonize areas where forbs and shrubs have been shaded out by dense second growth. Reserve clumps and dispersed trees would provide a component of large trees in regenerating stands that would provide habitat for cavity nesting birds, denning bears, marten, marbled murrelets and other species associated with large trees. Where safety permits, reserve trees would include large standing snags, as well as green trees. The reserve trees would be retained in the units throughout the rotation. In this EIS, **treatment acres** refer to the total acres within a unit, and **harvest acres** refer to the acres within the treatment area that is actually cut. For example, if we identify 10 acres of reserves within a 50 acre unit, we would display 50 treated acres, and 40 harvest acres. Where reserve trees are scattered across an entire unit, such as with overstory removal, treatment acres and harvest acres would be the same.

Six basic harvest prescriptions would be used and are described in more detail in Appendix A:

Even-aged Methods

1. Patch Cuts: clearcuts of 2 to 10 acres, yarded by helicopter (**PC**)
2. Clearcuts With <15% Retention: Alternative 6 has three units (18a, 19a and 19b) less than 15 acres each, that are small clearcuts with no retention within the unit (**CC**)

Two-aged Methods

3. Clearcuts With Reserves: at least 15% of the trees and/or acreage left in reserve clumps or scattered (**CC**)
4. Overstory Removal with Diameter Limits: one or more diameter limits leaving 10% to 25% of the trees scattered throughout the unit (**OR**)

Uneven-aged Methods

5. Group Selections: harvest of groups of trees up to 2 acres, yarded by helicopter (**GS**)
6. Partial Harvest using a combination of Overstory Removal, Group Selection and Individual Tree Marking to harvest 25% to 35% of the original stand (**IG**)

Unit Retention

Retention, or what is left in a stand after harvest, is measured in each harvest unit based on the silvicultural prescription and harvest method. Retention can be expressed in terms of "acres" retained in clumps, "trees" retained scattered throughout the stand, or "volume" retained, either scattered or clumped. Additional information on retention is included in the Silviculture and Timber section of Chapter 3 in this FEIS.

Helicopter Flight Restrictions

Repeated helicopter flights within 1/4 mile of eagle nest trees would be avoided from March 1 to May 31. If nests have young, we would extend the protection to August 31. Helicopters would be restricted from flying near sea lion haulouts and whales.

Nests

Harvest would not take place within 600 feet of an active raptor or marbled murrelet nest. If nests are found in or near harvest units, the boundaries would be modified. Goshawk nests would receive a 100 acre no-harvest buffer. Most bald eagle nests are within the protected 1000 foot beach fringe. No disturbance activity is allowed within 330 feet of an eagle nest.

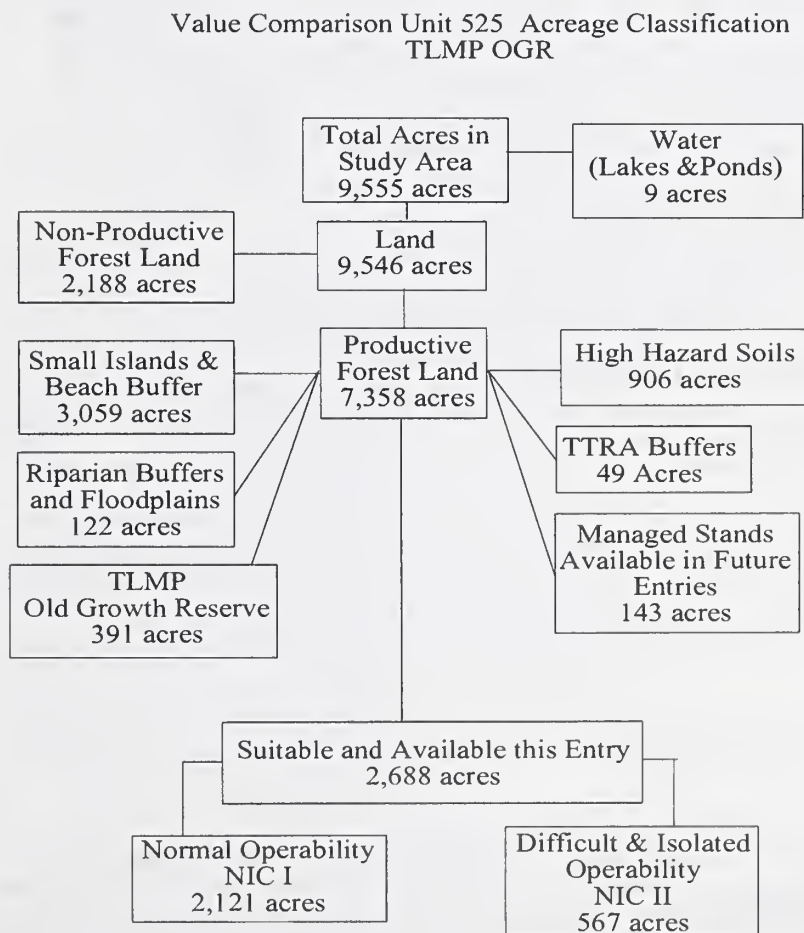
Alternatives Considered in Detail

Six alternatives are considered in detail. Alternative 1 is the No-action Alternative, under which the Project Area would have no timber harvest or road construction at this time. Current uses would continue at a similar pace, with a possible increase in tourism in adjacent areas. The Proposed Action is represented by Alternative 2. Alternatives 3, 4, 5 and 6 represent different means of satisfying the purpose and need than the proposed action, by responding with different emphases to the significant issues discussed in Chapter 1. Maps of all alternatives considered in detail are provided in this section, following each Alternative Harvest Unit Table. Larger-scale maps of the alternatives are contained in the project planning record.

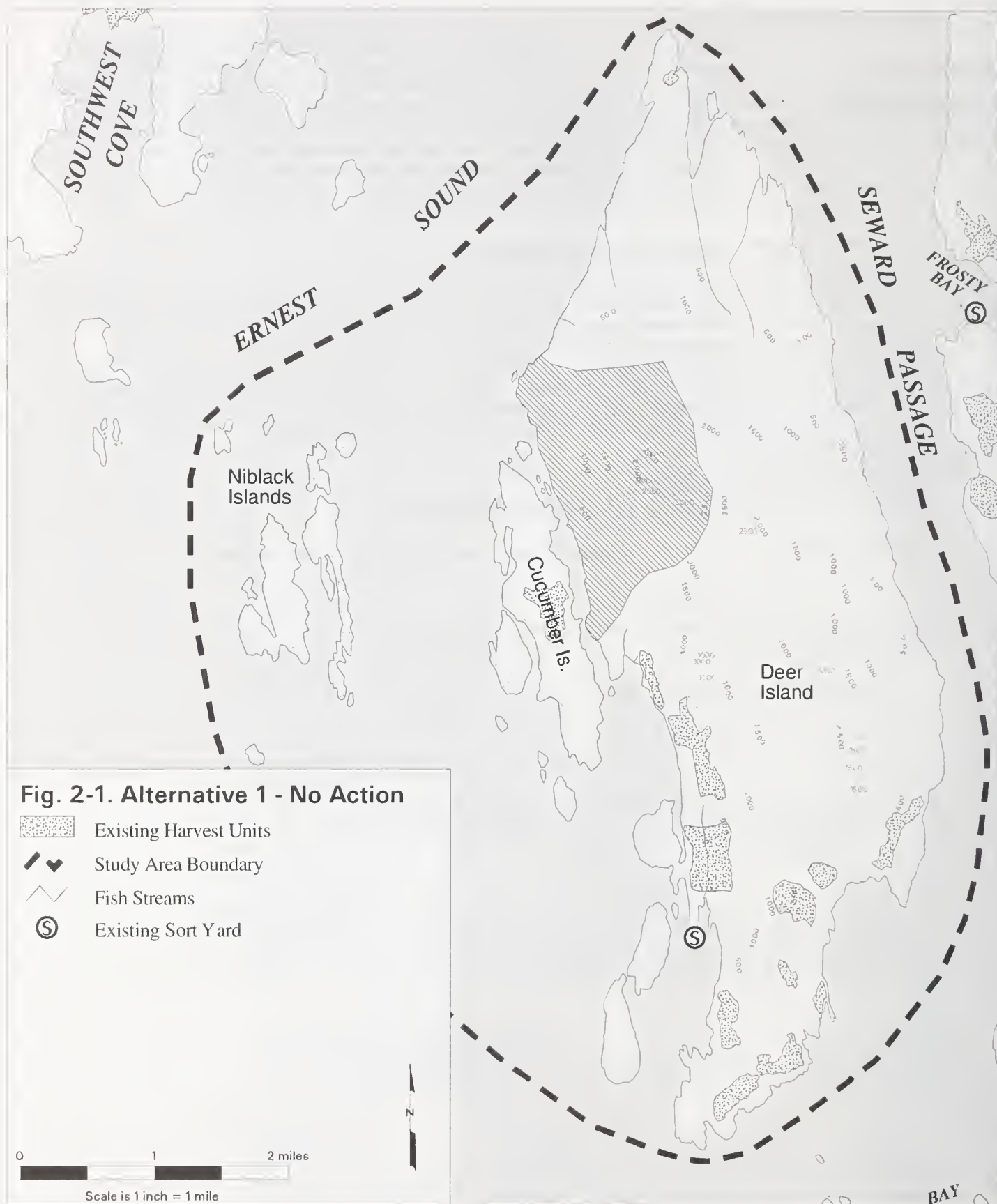
Alternative 1, No Action

The emphasis of this alternative is to propose no new timber harvest or road construction in the Kuakan Project Area at this time. The old-growth habitat reserve within the Project Area would remain in its current location, as mapped in the Forest Plan. The Council on Environmental Quality (CEQ) regulations (40 CFR 1502.14d) require that a "No Action" alternative be analyzed in every EIS. This alternative represents the existing condition against which all other alternatives are compared. The Alternative 1 (Existing Condition) map shows the distribution of vegetation associated with no new timber harvest.

Table 2-1
Existing Condition (Alternative 1)



2 Alternatives



Alternative 2, Proposed Action

This alternative was designed to optimize timber volume and harvest economics through use of cable and helicopter yarding systems. An LTF and approximately 9.36 miles (14.4 km) of road would be constructed on the north and east sides of Deer Island to allow cable yarding in as many units as practical. Other units on the island would be harvested using helicopter yarding. The previously developed LTF in the southwest bay of Deer Island could be used for a helicopter log landing for units near the southern tip of the island. Some units would require landing logs on barges. This alternative develops the entire road infrastructure potential for Deer Island. A portion of this road located approximately two miles south of the North LTF site crosses two areas (about 400 feet in length each) of steep (65-75%) slopes with unstable soils. This area is referred to as "the switchbacks" and would require expensive and careful road construction to minimize the risk of mass failure. The existing old-growth reserve would be modified by adding 122 acres to the southern portion, adjusting the north boundary southward, and including Cucumber Island, to meet minimum Forest Plan guidelines.

- A mixture of cable (50%), helicopter (46%), and shovel (4%) yarding would be used.
- A road system would be constructed from the North LTF to access cable ground, including approximately 6.25 miles of specified road and 3.11 miles of temporary road.
- A sort yard about 600 feet inland from the North LTF would be developed.
- The existing Deer Island West LTF could be re-developed.
- No log rafts would be built at the North LTF. All logs from this road system would be barged.
- Barge drops would be used for helicopter yarding of units away from the road system.
- Harvest prescriptions would primarily be a mix of clearcut-with-reserves and overstory removal with diameter limits. One unit would have group selections and one would have patch cuts.
- All temporary roads would be closed, with waterbars for drainage, after the sale.
- The entire 1 mile of the north road (6701) and the last 3.25 miles of the mainline road (6700) would be decommissioned, with drainage structures removed, after the sale.
- The remaining 2 miles of the mainline road system would retain drainage structures, but would be closed to motorized vehicles after the sale, with a gate and an administrative closure.

Desired conditions for other resources would be promoted where compatible with the theme of this alternative. For instance, trees are retained in all units to maintain structural diversity in the regenerating stand, provide wildlife habitat and meet visual quality objectives. However, the amount of retention in this alternative is generally less than would be retained in the same units in other alternatives. Some unit sizes and shapes were adjusted to maintain wildlife dispersal corridors, protect important habitat and enhance visuals. Most unit boundaries are based on the suitability of the terrain for cable yarding and the quality of the timber. This alternative takes an approach of heavy but less frequent entries over time.

About 785 acres would be treated, with actual harvest on approximately 689 acres, including 30 acres of road right-of-way. This alternative would result in harvest on about 9% of the 7358 acres of productive forest land within the project area, and would entail harvesting approximately 25% of the suitable and available forest land in this entry. We anticipate this level of harvest will produce approximately 15.6 million board feet of timber. Table 2-2 and Figure 2-2 display the specific activities for this alternative.

Classifying harvest prescriptions into the three categories described in the forest plan shows Alternative 2 prescriptions are 17% even-aged (121 acres), 80% two-aged (551 acres), and 3% uneven-aged (17 acres).

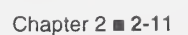
Over the rotation, clearcuts and overstory removal units would be entered once. Residual trees in these stands would be left as a legacy until the end of the rotation, or possibly be removed during a commercial thinning of the regenerated stand. Patch cuts and group selections would have the unit re-entered 2-4 times during a rotation, to harvest additional patches or groups. These entries would be spaced out over the rotation, with the result being 2-5 distinct age classes developing within the unit.

Table 2-2
Alternative 2 Harvest Units

Unit	Silvicultural Harvest Method	Treated Acres	Harvest Acres	Yarding Method
1	Group Selection, retain 75%	66	17	Helicopter
2a	Clearcut with 15% reserves	38	32	Cable
2d	Overstory Removal with 15% retention by diameter limit	36	36	Helicopter
3	Clearcut with 15% reserves & LTM	24	20	Cable
4	Clearcut with 15% reserves & LTM	21	18	Cable
5	Clearcut with 15% reserves & LTM	40	34	Cable
7	Clearcut with 15% reserves	40	34	Cable
8	Clearcut with 15% reserves & LTM	28	24	Cable
9	Overstory Removal with 15% retention by diameter limit	23	23	Helicopter
10	Clearcut with 10% reserves & LTM	35	31	Cable
11	Clearcut with 15% reserves & LTM	42	36	Cable
12a	Clearcut with 10% reserves & LTM	32	32	Cable
12c	Overstory Removal with 25% retention by diameter limit & LTM	34	34	Helicopter
12d	Clearcut with 10% reserves & LTM	14	13	Cable
13a	Clearcut with 20% reserves & LTM	43	34	Cable
13b	Overstory Removal with 25% retention by diameter limit & LTM	14	14	Helicopter
14	Clearcut with 15% reserves & LTM	38	32	Cable
15	Patch Cut with LTM, 5 acres each. Retain 60% of unit	37	15	Helicopter
16	Overstory Removal with 25% retention by diameter limit	32	32	Helicopter
17	Overstory Removal with 25% retention by diameter limit	27	27	Helicopter
18	Overstory Removal with 25% retention by diameter limit	52	52	Helicopter
20	Overstory Removal with 25% retention by diameter limit	55	55	Helicopter
21	Overstory Removal with 15% retention by diameter limit	14	14	Helicopter
	Approximate Unit acres	785	659	
ROW	Road Right of Way Clearing	30	30	Shovel
	Total harvest acres		689	

	EIS Prescription	% of Harvest	Harvest Acres	TLMP Method
1	Patch Cut (PC)	2%	15	Even-aged
2	Clearcuts With <15% Retention (CC)+ROW	15%	106	Even-aged
3	Clearcuts With 15%+ Reserves (CC)	38%	264	Two-aged
4	Overstory Removal - Diameter Limit (OR)	42%	287	Two-aged
5	Group Selection (GS)	3%	17	Uneven-aged
6	Partial Harvest (IG)			Uneven-aged

Anticipated average harvest for this alternative is 22.6 thousand board feet per acre. We expect an output of approximately 15.6 million board feet of timber.



2 Alternatives

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Alternative 3

The theme of this alternative is to optimize the volume of cable harvestable timber on the north end of Deer Island while minimizing impacts to wildlife habitat and visuals on the south end of the island, where previous harvest has occurred. This alternative would require construction of about 4.14 miles (6.4 km) of road to access the areas on the northern end that are accessible by cable yarding systems. The segment of road crossing the areas of steep slopes, referred to as the switchbacks, would not be included. Helicopter yarding would be used to access units south of the steep switchback area. The existing old-growth reserve would be modified by adding 122 acres to the southern portion of the existing reserve, adjusting the existing northern boundary southward, and including Cucumber Island in the reserve.

- A mixture of helicopter yarding (72%), with some cable (25%) and shovel (3%) yarding on the north end.
- A road system would be constructed from the North LTF to access cable ground, including approximately 3 miles of specified road and 1 mile of temporary road.
- The road through the high risk "switchback" area would not be constructed.
- A sort yard about 600 feet inland from the North LTF would be developed.
- The existing Deer Island West LTF could be re-developed.
- No log rafts would be built at the North LTF. All logs from this road system would be barged.
- Barge drops would be used for helicopter yarding of units away from the road system.
- Harvest prescriptions would be a mix of clearcut-with-reserves, overstory removal with diameter limits, group selections, and one patch cut unit.
- All temporary roads would be closed, with waterbars for drainage, after the sale.
- The entire 1 mile of the north road (Road 6701) would be decommissioned, with drainage structures removed, after the sale.
- The remaining 2 miles of the mainline road system would retain drainage structures, but would be closed to motorized vehicles after the sale, with a gate and an administrative closure.

Desired conditions for other resources would be promoted where compatible with the theme of this alternative. For instance, trees are retained in all units to maintain structural diversity in the regenerating stand, provide wildlife habitat and meet visual quality objectives. Some unit sizes and shapes were adjusted to maintain wildlife dispersal corridors, protect important habitat and enhance visuals. This alternative takes an approach of light but frequent entries over time.

About 642 acres would be treated, with actual harvest on approximately 456 acres, including 12 acres of road right-of-way. This alternative would result in harvest on about 6% of the 7358 acres of productive forest land within the project area, and would entail harvesting approximately 17% of the suitable and available forest land in this entry. We anticipate this level of harvest will produce approximately 10.5 million board feet of timber. Table 2-3 and Figure 2-3 display the specific activities for this alternative.

Classifying harvest prescriptions into the three categories described in the forest plan shows Alternative 3 prescriptions are 9% even-aged (42 acres), 82% two-aged (374 acres), and 9% uneven-aged (40 acres).

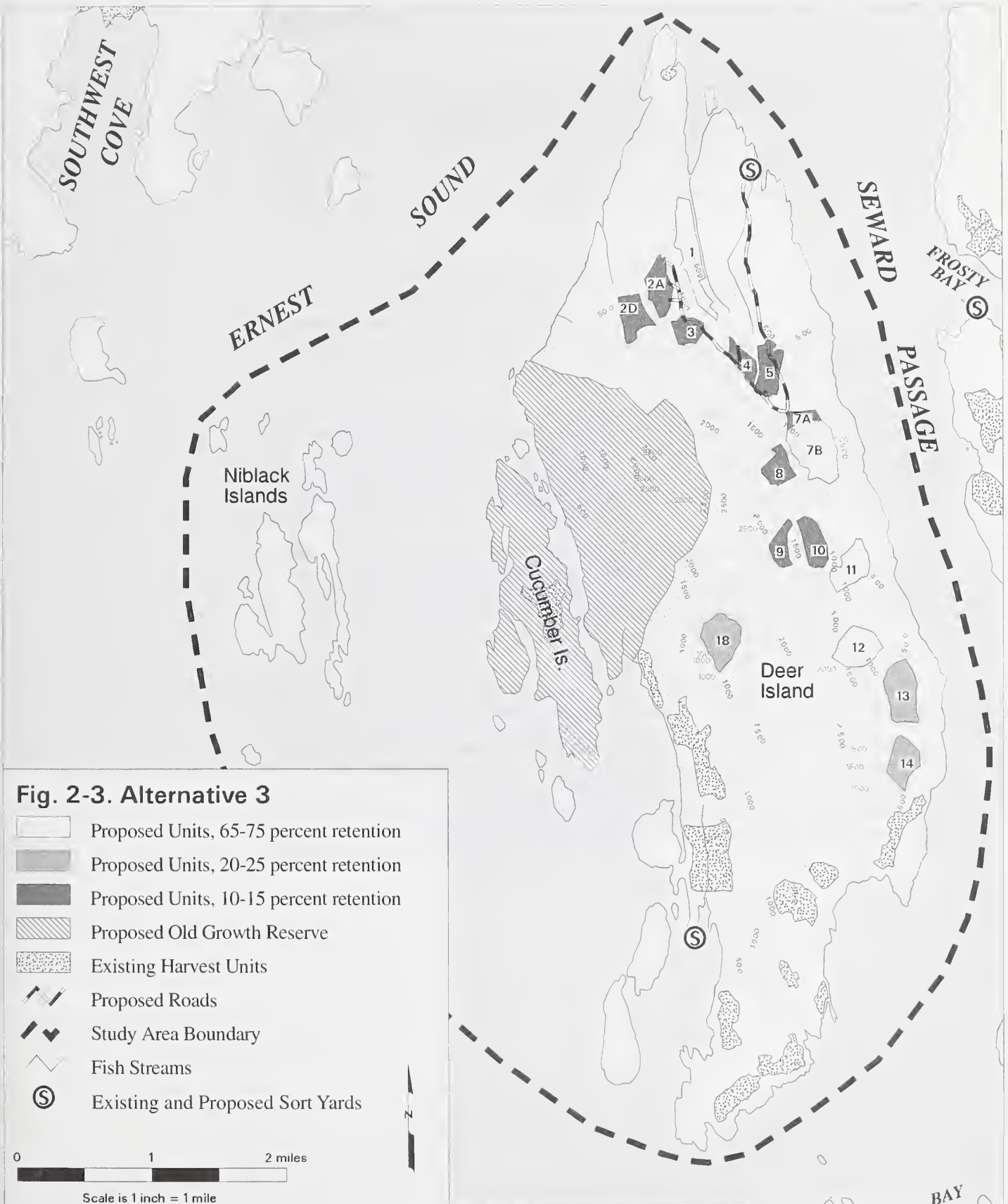
Over the rotation, clearcuts and overstory removal units would be entered once. Residual trees in these stands would be left as a legacy until the end of the rotation, or possibly be removed during a commercial thinning of the regenerated stand. Patch cuts and group selections would have the unit re-entered 2-4 times during a rotation, to harvest additional patches or groups. These entries would be spaced out over the rotation, with the result being 2-5 distinct age classes developing within the unit.

Table 2-3
Alternative 3 Harvest Units

Unit	Silvicultural Harvest Method	Treated Acres	Harvest Acres	Yarding Method
1	Group Selection, retain 75%	66	17	Helicopter
2a	Clearcut with 15% reserves	38	32	Cable
2d	Overstory Removal with 15% retention by diameter limit	36	36	Helicopter
3	Clearcut with 15% reserves & LTM	24	20	Cable
4	Clearcut with 15% reserves & LTM	21	18	Cable
5	Clearcut with 15% reserves & LTM	40	34	Cable
7a	Clearcut with 10% reserves	12	11	Cable
7b	Patch Cut, retain 75%, up to 5 acres each	81	20	Helicopter
8	Overstory Removal with 15% retention by diameter limit & LTM	28	28	Helicopter
9	Overstory Removal with 15% retention by diameter limit	23	23	Helicopter
10	Overstory Removal with 15% retention by diameter limit & LTM	35	35	Helicopter
11	Group Selection, retain 75%	42	11	Helicopter
12	Group Selection, retain 75%	49	12	Helicopter
13	Overstory Removal with 25% retention by diameter limit & LTM	57	57	Helicopter
14	Overstory Removal with 25% retention by diameter limit & LTM	38	38	Helicopter
18	Overstory Removal with 25% retention by diameter limit	52	52	Helicopter
	Approximate Unit acres	642	444	
ROW	Road Right of Way Clearing	12	12	Shovel
	Total harvest acres		456	

	EIS Prescription	% of Harvest	Harvest Acres	TLMP Method
1	Patch Cut (PC)	4%	20	Even-aged
2	Clearcuts With <15% Retention (CC)+ROW	5%	22	Even-aged
3	Clearcuts With 15%+ Reserves (CC)	23%	105	Two-aged
4	Overstory Removal - Diameter Limit (OR)	59%	269	Two-aged
5	Group Selection (GS)	9%	40	Uneven-aged
6	Partial Harvest (IG)			Uneven-aged

Anticipated average harvest for this alternative is 23.1 thousand board feet per acre. We expect an output of approximately 10.5 million board feet of timber.



2 Alternatives

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Alternative 4

The theme of this alternative is to maximize helicopter harvest economics, while being responsive to concerns about wildlife habitat retention, visual impacts and increased access. The island would retain its roadless characteristic, as no roads would be constructed with this alternative. Helicopter yarding would be used to harvest all timber. The proposed LTF on the north end of the island would not be developed. This entry would minimize soils, water quality and visual concerns. The existing old-growth reserve would be modified by adding 122 acres to the southern portion, adjusting the north boundary southward, and including Cucumber Island in the reserve.

- All helicopter yarding.
- No roads, new sortyards or new LTF would be constructed.
- The existing Deer Island West LTF could be re-developed.
- Barge drops would be used for helicopter yarding.
- Harvest prescriptions would be predominately overstory removal with diameter limits retaining 15% to 25%. One group selection unit is included in this alternative

Desired conditions for other resources would be promoted where compatible with the theme of this alternative. For instance, trees are retained in all units to maintain structural diversity in the regenerating stand, provide wildlife habitat and meet visual quality objectives. Some unit sizes and shapes were adjusted to maintain wildlife dispersal corridors, protect important habitat and enhance visuals. This alternative takes an approach of heavier but less frequent entries over time.

About 738 acres would be treated, with actual harvest on approximately 689 acres. This alternative would result in harvest on about 9% of the 7358 acres of productive forest land within the project area, and would entail harvesting approximately 25% of the available forest land in this entry. We anticipate this level of harvest will produce approximately 15 million board feet of timber. Table 2-4 and Figure 2-4 display the specific activities for this alternative.

Classifying harvest prescriptions into the categories described in the forest plan shows Alternative 4 prescriptions are 98% two-aged (672 acres) and 2% uneven-aged (17 acres).

Over the rotation, clearcuts and overstory removal units would be entered once. Residual trees in these stands would be left as a legacy until the end of the rotation, or possibly be removed during a commercial thinning of the regenerated stand. Patch cuts and group selections would have the unit re-entered 2-4 times during a rotation, to harvest additional patches or groups. These entries would be spaced out over the rotation, with the result being 2-5 distinct age classes developing within the unit.

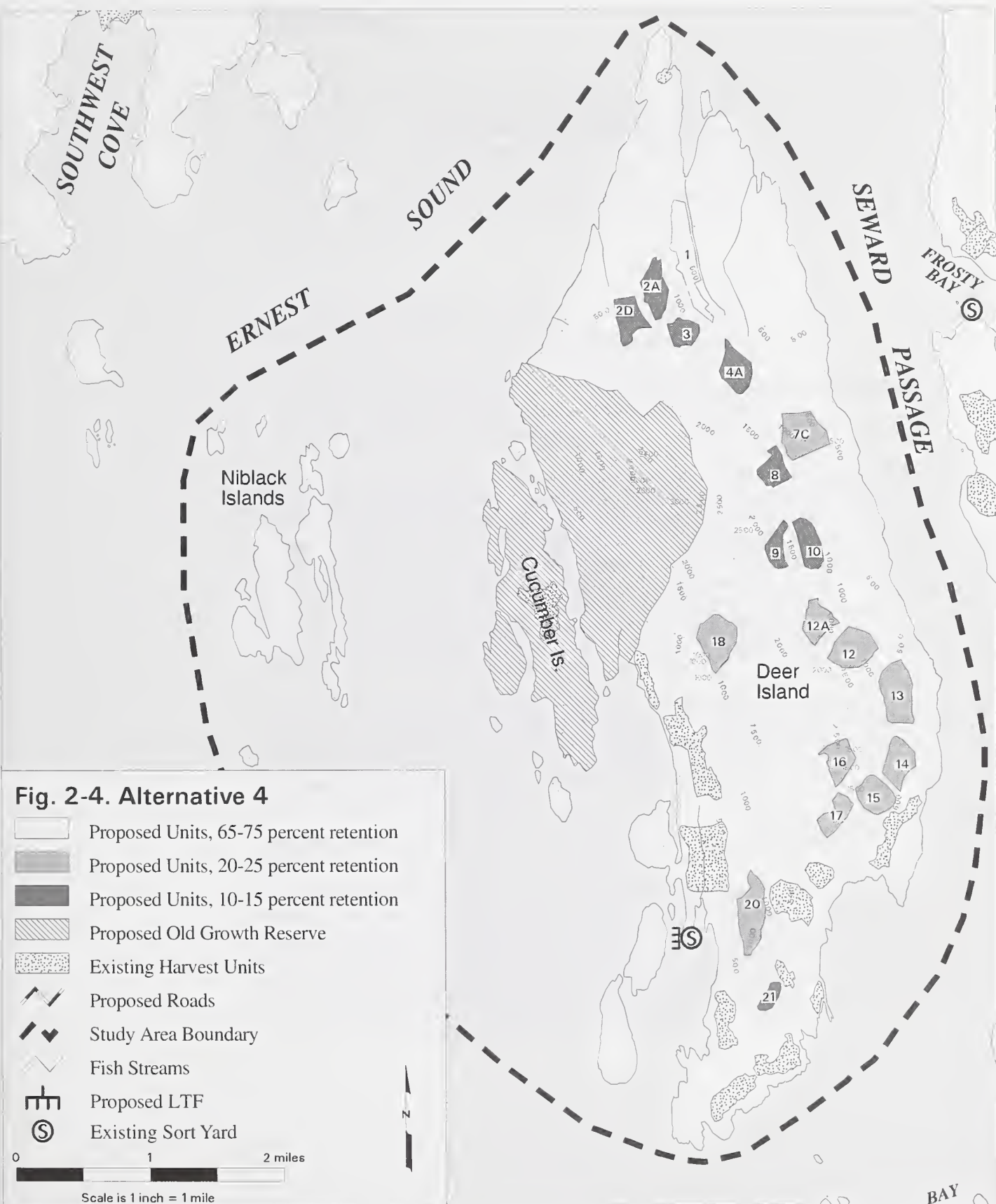
2 Alternatives

Table 2-4
Alternative 4 Harvest Units

Unit	Silvicultural Harvest Method	Treated Acres	Harvest Acres	Yarding Method
1	Group Selection, retain 75%	66	17	Helicopter
2a	Overstory Removal with 15% retention by diameter limit	38	38	Helicopter
2d	Overstory Removal with 15% retention by diameter limit	36	36	Helicopter
3	Overstory Removal with 15% retention by diameter limit & LTM	24	24	Helicopter
4a	Overstory Removal with 15% retention by diameter limit & LTM	38	38	Helicopter
7c	Overstory Removal with 25% retention by diameter limit	57	57	Helicopter
8	Overstory Removal with 15% retention by diameter limit & LTM	28	28	Helicopter
9	Overstory Removal with 15% retention by diameter limit	23	23	Helicopter
10	Overstory Removal with 15% retention by diameter limit & LTM	35	35	Helicopter
12a	Overstory Removal with 25% retention by diameter limit & LTM	32	32	Helicopter
12	Overstory Removal with 25% retention by diameter limit & LTM	49	49	Helicopter
13	Overstory Removal with 25% retention by diameter limit & LTM	57	57	Helicopter
14	Overstory Removal with 25% retention by diameter limit & LTM	38	38	Helicopter
15	Overstory Removal with 25% retention by diameter limit & LTM	37	37	Helicopter
16	Overstory Removal with 25% retention by diameter limit	32	32	Helicopter
17	Overstory Removal with 25% retention by diameter limit	27	27	Helicopter
18	Overstory Removal with 25% retention by diameter limit	52	52	Helicopter
20	Overstory Removal with 25% retention by diameter limit	55	55	Helicopter
21	Overstory Removal with 15% retention by diameter limit	14	14	Helicopter
	Approximate Unit acres	738	689	
ROW	Road Right of Way Clearing	0	0	
	Total harvest acres		689	

	EIS Prescription	% of Harvest	Harvest Acres	TLMP Method
1	Patch Cut (PC)			Even-aged
2	Clearcuts With <15% Retention (CC)			Even-aged
3	Clearcuts With 15%+ Reserves (CC)			Two-aged
4	Overstory Removal - Diameter Limit (OR)	98%	672	Two-aged
5	Group Selection (GS)	2%	17	Uneven-aged
6	Partial Harvest (IG)			Uneven-aged

Anticipated average harvest for this alternative is 21.8 thousand board feet per acre. We expect an output of approximately 15.0 million board feet of timber.



2 Alternatives

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Alternative 5

The theme of this alternative is to emphasize wildlife habitat and security, visual objectives, and water quality through uneven-aged management. This alternative treats larger blocks of land with 25% to 35% harvest within each block. Helicopter yarding would be used to harvest all timber. Harvest would be accomplished with a mixture of overstory removal, group selections, and individual tree marking. The island would retain its roadless characteristic, as no roads would be constructed with this alternative. The proposed LTF on the north end of the island would not be developed. The old-growth reserve would be relocated to the northeast corner of Deer Island, a location recommended by biologists working on the project.

- All helicopter yarding.
- No roads, new sortyards or new LTF would be constructed.
- The existing Deer Island West LTF could be re-developed.
- Barge drops would be used for helicopter yarding.
- Harvest prescriptions would be a mix of group selection, individual tree marking and overstory removal with diameter limits, retaining 65% to 75%.
- The old-growth reserve would be relocated to the northeast corner of the island.

This alternative incorporates an uneven-aged management strategy for the island. The prescriptions used would respond to economic concerns by targeting some of the high value lumber trees, while leaving high value wildlife trees and structure within the residual stand. This approach is based on the premise that high value wildlife trees are not necessarily the same as high value lumber trees. High value lumber trees tend to be medium to large trees with straight boles, few branches and low defect. High value wildlife trees tend to be large diameter trees, often hollow, with lots of branches and high amounts of defect. This alternative focuses on removal of high value lumber trees while retaining 65% to 75% of the original stand. The remaining forest structure would allow for wildlife dispersal and would provide canopy cover within the units.

About 1345 acres would be treated. This alternative would result in harvest treatment on about 18% of the 7358 acres of productive forest land within the project area. It would entail harvesting on approximately 54% of the suitable forest land, and removing approximately 18% of the available volume in this entry. We anticipate this level of harvest will produce approximately 12.1 million board feet of timber. Table 2-5 and Figure 2-5 display the specific activities for this alternative.

Classifying harvest prescriptions into the categories described in the forest plan shows Alternative 5 prescriptions are 100% uneven-aged (1345 acres).

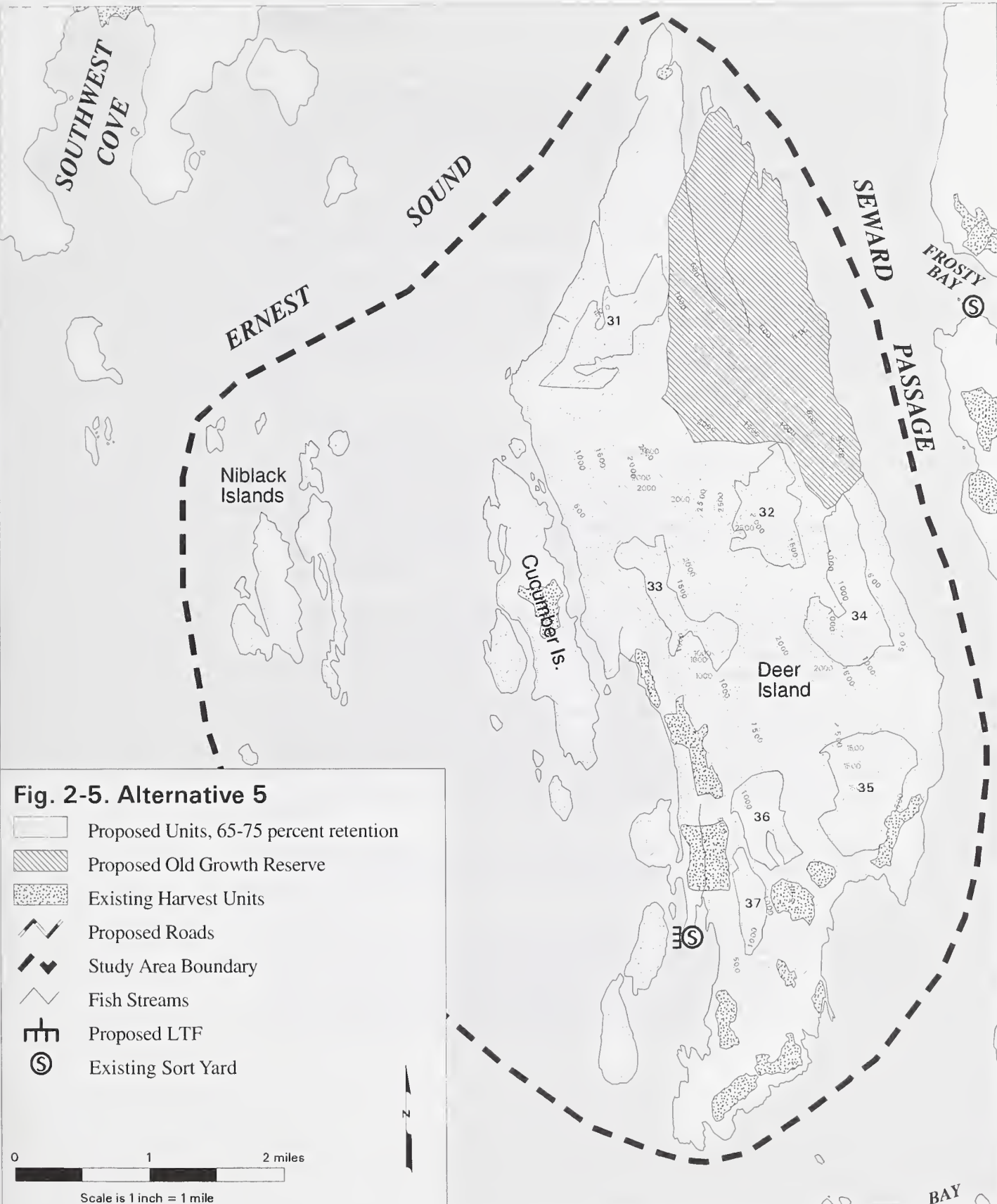
The initial partial harvest entry (Alt. 5) would not be considered a regeneration harvest, and we would anticipate very limited natural regeneration. We do anticipate increased growth on residual trees as a result of opening the canopy. Partial harvest units would have a second entry at approximately 1/3 the rotation age to remove more of the overstory and create enough openings to enhance regeneration under the remaining canopy. A third entry would occur 2/3 into the rotation to remove the remaining overstory and promote growth in the understory. Some legacy of large trees would probably be left, even after the third entry.

Table 2-5
Alternative 5 Harvest Units

Unit	Silvicultural Harvest Method	Treated Acres	Harvest Acres	Yarding Method
31	Individual/Group Selection, retain 65%-75%	225	225	Helicopter
32	Individual/Group Selection, retain 65%-75%	196	196	Helicopter
33	Individual/Group Selection, retain 65%-75%	169	169	Helicopter
34	Individual/Group Selection, retain 65%-75%	260	260	Helicopter
35	Individual/Group Selection, retain 65%-75%	284	284	Helicopter
36	Individual/Group Selection, retain 65%-75%	133	133	Helicopter
37	Individual/Group Selection, retain 65%-75%	78	78	Helicopter
	Approximate Unit acres	1345	1345	
ROW	Road Right of Way Clearing	0	0	
	Total harvest acres		1345	

	EIS Prescription	% of Harvest	Harvest Acres	TLMP Method
1	Patch Cut (PC)			Even-aged
2	Clearcuts With <15% Retention (CC)			Even-aged
3	Clearcuts With 15%+ Reserves (CC)			Two-aged
4	Overstory Removal - Diameter Limit (OR)			Two-aged
5	Group Selection (GS)			Uneven-aged
6	Partial Harvest (IG)	100%	1345	Uneven-aged

Anticipated average harvest for this alternative is 9.0 thousand board feet per acre. We expect an output of approximately 12.1 million board feet of timber.



2 Alternatives

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Alternative 6

The theme of this alternative is to mimic natural disturbance patterns. Some parts of Deer Island have been kept in an even-age state due to periodic wind events that blow down exposed stands. Other more protected parts of the island are maintained as old growth over time through the death of individual trees or groups of trees that subsequently fall and create an opening or site conditions that allow young trees to fill in the gap. This alternative treats areas that show evidence of windthrow potential with patch cuts or small clearcuts. Areas that appear to be more protected from wind disturbance are treated with group selections or overstory removal. The old-growth reserve would be relocated to the northeast corner of Deer Island, a location recommended by biologists working on the project.

The island would retain its roadless characteristic, as no roads would be constructed with this alternative. Helicopter yarding would be used to harvest all timber. The proposed LTF on the north end of the island would not be developed. This entry would minimize soils, water quality, wildlife and visual concerns. This alternative would move the old-growth reserve to the northeast part of Deer Island, a location recommended by biologists working on the project.

- All helicopter yarding.
- No roads, new sortyards or new LTF would be constructed.
- The existing Deer Island West LTF could be re-developed.
- Barge drops would be used for helicopter yarding.
- Harvest prescriptions would be a mix of small clearcuts, patch cuts, and overstory removal with diameter limits retaining 10% to 25%. One group selection unit is included in this alternative

Desired conditions for other resources would be promoted where compatible with the theme of this alternative. For instance, trees are retained in most units to maintain structural diversity in the regenerating stand, provide wildlife habitat and meet visual quality objectives. This alternative takes an approach of light but more frequent entries over time.

About 692 acres would be treated, with actual harvest on approximately 475 acres. This alternative would result in harvest on about 6% of the 7358 acres of productive forest land within the project area, and would entail harvesting approximately 20% of the available forest land in this entry. We anticipate this level of harvest will produce approximately 10.3 million board feet of timber. Table 2-6 and Figure 2-6 display the specific activities for this alternative.

Classifying harvest prescriptions into the three categories described in the forest plan shows Alternative 6 prescriptions are 22% even-aged (107 acres), 72% two-aged (340 acres), and 6% uneven-aged (28 acres).

Over the rotation, clearcuts and overstory removal units would be entered once. Residual trees in these stands would be left as a legacy until the end of the rotation, or possibly be removed during a commercial thinning of the regenerated stand. Patch cuts and group selections would have the unit re-entered 2-4 times during a rotation, to harvest additional patches or groups. These entries would be spaced out over the rotation, with the result being 2-5 distinct age classes developing within the unit.

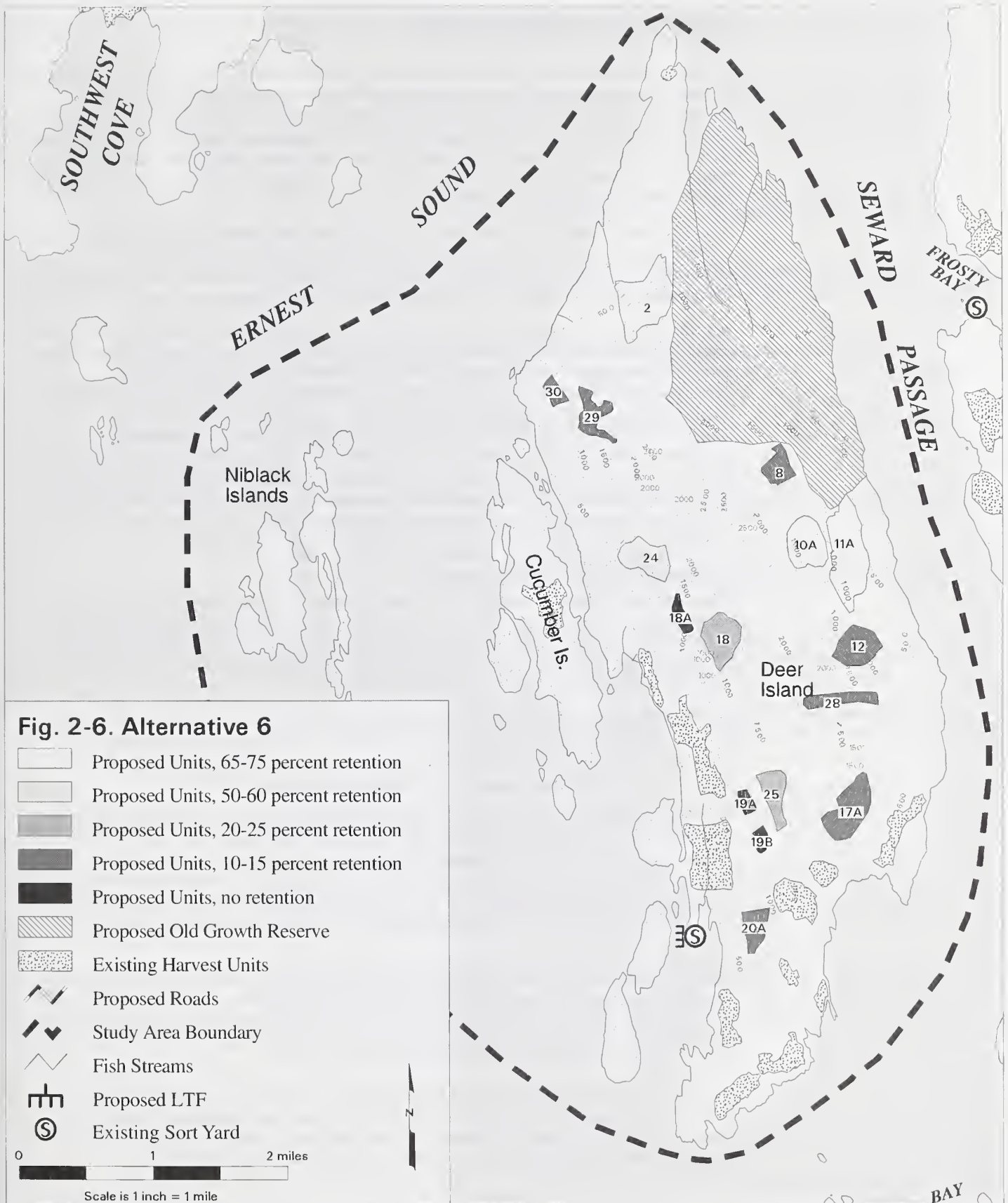
2 Alternatives

Table 2-6
Alternative 6 Harvest Units

Unit	Silvicultural Harvest Method	Treated Acres	Harvest Acres	Yarding Method
2	Patch Cut in 2-10 acre patches, retain 67%	98	32	Helicopter
8	Overstory Removal with 15% retention by diameter limit & LTM	28	28	Helicopter
10a	Patch Cut in 2-10 acre patches & LTM, retain 75%	58	15	Helicopter
11a	Group Selection, retain 75%	110	28	Helicopter
12	Overstory Removal with 15% retention by diameter limit & LTM	49	49	Helicopter
17a	Overstory Removal with 10% retention by diameter limit	66	66	Helicopter
18	Overstory Removal with 25% retention by diameter limit	52	52	Helicopter
18a	Clearcut	15	15	Helicopter
19a	Clearcut	10	10	Helicopter
19b	Clearcut	10	10	Helicopter
20a	Overstory Removal with 10% retention by diameter limit	30	30	Helicopter
24	Patch Cut in 2-10 acre patches & LTM, retain 50%	51	25	Helicopter
25	Overstory Removal with 25% retention by diameter limit	36	36	Helicopter
28	Overstory Removal with 10% retention by diameter limit & LTM	30	30	Helicopter
29	Overstory Removal with 10% retention by diameter limit	35	35	Helicopter
30	Overstory Removal with 10% retention by diameter limit	14	14	Helicopter
	Approximate Unit acres	692	475	
ROW	Road Right of Way Clearing	0	0	
	Total harvest acres		475	

	EIS Prescription	% of Harvest	Harvest Acres	TLMP Method
1	Patch Cut (PC)	15%	72	Even-aged
2	Clearcuts With <15% Retention (CC)	7%	35	Even-aged
3	Clearcuts With 15%+ Reserves (CC)			Two-aged
4	Overstory Removal - Diameter Limit (OR)	72%	340	Two-aged
5	Group Selection (GS)	6%	28	Uneven-aged
6	Partial Harvest (IG)			Uneven-aged

Anticipated average harvest for this alternative is 21.7 thousand board feet per acre. We expect an output of approximately 10.3 million board feet of timber.



Mitigation Measures

The analysis documented in this EIS discloses the possible adverse impacts that may occur as the result of implementing the actions proposed. Therefore, measures were formulated to mitigate these impacts. These measures were guided by the Forest Plan Goals and Objectives for the applicable LUDs and follow the Forest-wide Standards and Guidelines (USDA Forest Service, 1997b). The mitigation measures are grouped into two categories. General mitigation measures apply to the entire project, while site-specific mitigation measures are identified for specific units or roads.

A wide variety of site-specific mitigation measures, designed primarily to avoid or minimize adverse impacts, have been evaluated and those that are most appropriate have been incorporated into harvest unit and road design. These site-specific measures are summarized in Appendix G and are referenced in the unit and road cards (Appendices A and B).

In addition to the site-specific mitigation measures listed in Appendix G and the unit and road cards, a variety of mitigation measures would apply to all harvest and construction activities and would be incorporated in timber harvest unit and road design. These include all appropriate BMPs. Direction for use of BMPs on National Forest System Lands in Alaska is included in Chapter 10 of FSH 2509.22, the Region 10 Soil and Water Conservation Handbook (USDA Forest Service, 1996). The handbook describes the application, monitoring, evaluation and refinement of these BMPs. Appendix C of the Forest Plan (USDA Forest Service, 1997b) provides a list and brief summary of the BMPs used in Region 10. Many other Forest Plan Standards and Guidelines apply, in addition to those cited in the list of mitigation measures below. These standards and guidelines, including Appendix C of the Forest Plan, are incorporated by reference (USDA Forest Service, 1997b).

General Mitigation Measures

These general measures may apply to all units and roads in a project area and/or they may apply to other portions of a project area. The source(s) of each general measure are listed after the measure in terms of individual Forest-wide Standards and Guidelines (see Chapter 4 of the Forest Plan) or BMPs (see Appendix C of the Forest Plan and Chapter 10 of FSH 2509.22, The Soil and Water Conservation Handbook).

Air Quality Protection: Design projects to control air pollution impacts and to ensure that the predicted emissions from all pollution sources do not exceed ambient air quality standards, as specified under the Alaska Administration Code, Title 18, Chapter 50; applicable permits will be obtained from ADEC for all projects. (AIR 112).

Soil/Water Protection during Timber Sale Planning: Incorporate soil and water resource considerations into timber sale planning. Include site-specific considerations, identifying wetlands and riparian areas; locating and designing harvest activities to protect these resources; designating water quality protection needs on sale area maps; incorporating erosion control and timing responsibilities into the Operating Schedule; and including non-recurring "C" provisions to protect soil and water resources in timber sale contracts. (BMPs 13.1, 13.2, 13.3, 13.4, 13.17)

Soil/Water Protection during Road Development: Implement measures to reduce surface erosion and drainage interruption related to transportation including water barring and cross-draining roads using ditches and culverts to prevent water running long distances over roads, closure, and seeding and fertilizing cut-and-fill slopes. (BMPs 14.1, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.10, 14.11, 14.12, and 14.19)

Soil/Water Protection during Road Management: Conduct road maintenance and snow removal operations to minimize disruption of road surfaces, embankments, ditches, and drainage facilities, and use road closures or other measures to keep road surface and road site erosion at low or background levels. (TRAN23-I, BMPs 14.20 and 14.23)

Temporary Road Obliteration: Obliterate temporary roads after use, remove or bypass drainage structures and install waterbars in appropriate places. (RIP2-II and BMPs 12.17 and 14.24)

Soil/Water Protection during Development of Rock Sources, LTFs, & Other Facilities: Implement measures to reduce surface erosion and other impacts on soils and water from gravel sources and quarries, LTFs, sort yards, and other facilities. (BMPs 14.18, 14.19, 14.25, 14.26, and 14.27)

LTF Siting: Site LTFs in locations which will best avoid or minimize potential impacts on water quality, aquatic habitat, wildlife, and other resources. (TRAN214-V, WILD112, and BMP 14.4)

Accidental Spills: Implement measures and plans to prevent the contamination of soil and water from accidental spills of petroleum products and hazardous substances. (BMP 12.8 and 12.9)

Heritage Site Discovery: Suspend work if a heritage site is discovered during project implementation. Authorize resumption of work only after consultation with the State Historic Preservation Office is complete.

Maximum Size of Created Openings: Limit created openings to a maximum size of 100 acres. (TIM114-IV)

Maintain Minor Tree Species: Selectively maintain minor species (e.g., yellow-cedar, western red cedar, Pacific yew), where appropriate for the site, as viable components of future stand, for vegetative diversity, and for seed trees. (TIM111-2-I, TIM114-II)

Certification of Reforestation: Certify that every unit that receives a final harvest meets or surpasses the stocking guidelines and certification standards (FSH 2409.17) within 5 years. (TIM24)

Wetland Protection: Minimize the loss of all wetlands, but particularly the higher value wetlands (especially fens), and minimize the adverse impacts of land management activities on wetlands; follow Executive Order 11990 and the BMPs. (WET-I, WET-III, BMP 12.5)

Beach and Estuary Fringe Protection: Avoid harvest within the beach and estuary fringe; avoid road construction within this zone, except where no feasible alternative exists. (BEACH 2)

Non-Development LUD Protection: Avoid timber harvest impacts and minimize road construction within non-development LUDs such as Old-Growth Habitat, Remote and Semi-Remote Recreation, and Wild and Scenic River corridors.

Connectivity Between Old Growth Reserves: Provide corridors of old growth forest between and among medium and large old-growth reserves. Where sufficient connectivity does not exist, or where the minimum Forest Plan criteria are not met, relocate or redesign mapped, small old growth reserves. (WILD112-XVIII)

Marine Mammal Protection: Ensure that Forest Service permitted or approved activities are conducted in a manner consistent with the Marine Mammal Protection Act, the Endangered Species Act, and National Marine Fisheries Service regulations for approaching whales, dolphins, porpoises, seals, and sea lions. Site camps, LTFs, and other facilities at least 1 mile away from known Stellar sea lion haulouts. (TE&S-I)

Road Mitigation Measures Common to Alternatives 2 and 3

Some mitigation measures apply specifically to road construction, and so apply only to Alternatives 2 and 3, which are the only alternatives that propose construction of roads.

Storm-proofing Roads

Long term roads will be designed with armored dips adjacent to culverts, substantial ditch blocks, drivable waterbars, and other protective measures to minimize the risks of culvert failure or erosion of the road surfaces and ditchlines. These measures will ensure the integrity of the roads in the project area during periods of inactivity.

Location of North Log Transfer Facility (LTF)

All action alternatives would allow for reconstruction and use of the existing Deer Island West LTF. Alternatives 2 and 3 consider construction of a road system with a new LTF located on the northeast shore of Deer Island. Several areas along the northeast shore were investigated for use as a possible LTF, but only one site is carried forward in the EIS. Appendix D has additional information concerning the siting of the proposed LTF.

Due to concerns for the rich marine environment around the North LTF site, dumping and rafting of logs in the water at the North LTF would not be permitted under any alternative. The LTF would be designed to allow barge loading and logs would be required to be loaded directly onto a barge. A sort yard would be constructed inland approximately 600 feet from the LTF. The LTF bulkhead and rock ramp would be removed following completion of the sale.

Road Maintenance and Access Management

We would close the roads to motorized vehicles (except for administrative use) after the sale is completed under all action alternatives. Road closures mitigate some wildlife concerns; especially regarding increased vulnerability to hunting of deer and wolves. A gate would be installed near the beginning of the road and an administrative closure order would be enforced. The gate would be designed such that ATVs could not go under it and placed in a location that would make it difficult to get around it. The gate would be made of iron - not the usual perforated steel, so ATVs would not have the power to pull over or destroy the barricade. During harvest, the gate would be open, but only administrative use would be allowed. Following sale completion, only necessary administrative use, such as regeneration surveys, thinning and future timber sales, would be allowed. Roads will be maintained at Maintenance Level 1, where custodial maintenance is performed to protect the road investment and keep damage to adjacent resources to an acceptable level. Non-motorized travel would not be restricted.

Instream Activities

Instream activities are proposed in only two alternatives. Road cards display fish passage requirements and other mitigation measures (Appendix B).

Temporary Roads

Temporary roads would be obliterated after use by removing all drainage structures to restore natural drainage patterns, adding waterbars as needed to control runoff, and establishing vegetative cover by seeding or other methods. Red alder (*Alnus rubra*), an invasive species that naturally colonizes disturbed areas, is the species that would be used.

Monitoring

Monitoring activities can be divided into three broad categories: Forest Plan monitoring, routine implementation monitoring, and project-specific effectiveness monitoring.

Forest Plan Monitoring

The National Forest Management Act requires that National Forests monitor and evaluate their forest plans (36 CFR 219.11). The Forest Plan (Chapter 6) includes the monitoring and evaluation activities to be conducted as part of Forest Plan implementation. Some Forest Plan monitoring, such as buffer stability, road condition surveys and BMP implementation, is done on all management activities. Other Forest Plan monitoring is conducted over the entire forest on a sample basis. Samples may be taken from within the Kuakan Project Area.

Tongass staff annually conduct a review of BMP implementation and effectiveness. The results of this and other monitoring are summarized in Tongass National Forest Annual Monitoring and Evaluation Reports. This report provides information about how well the management direction of the Forest is being carried out, and measures the accomplishment of anticipated outputs, activities and effects.

Routine Implementation Monitoring

Routine implementation monitoring is part of the administration of a timber sale contract. The sale administrators and road inspectors ensure that the prescriptions contained on the unit and road cards are incorporated into contract documents and then inspect performance relative to contract requirements. Input by resource staff specialists, such as fisheries biologists, soil scientists, hydrologists and engineers, is regularly requested during this process. These specialists provide technical advice when questions arise during project implementation.

Routine implementation monitoring assesses whether the project was implemented as designed and whether or not it complies with the Forest Plan. Planning for routine implementation monitoring began with the preliminary design of harvest units and roads. The unit and road cards (Appendices A and B) will be the basis for determining whether recommendations were implemented for various aspects of the Kuakan Project.

Project-specific Effectiveness Monitoring

Effectiveness monitoring seeks answers about the effectiveness of design features or mitigation measures in protecting natural resources and their beneficial uses. Appendix C of this EIS contains additional information about monitoring and improvement projects for the Kuakan area.

Alternative Comparison by Issue

Issue 1: Scenic, Recreation and Tourism Values

People are concerned about how this sale will change the scenic conditions, and recreation and tourism potential in the Deer Island area. All alternatives are designed to meet Forest Plan objectives by meeting the Visual Quality Objectives (VQO) prescribed. When examining the change to the scenery proposed in each alternative, the ranking of the alternatives vary depending the point from which you view the Project Area. By averaging the ranking each alternative received from the five different viewpoints, the ranking would be as follows (from least visible change, to most visible change): Alternative 1, Alternative 5, Alternative 6, Alternative 4 and 3 (tie), Alternative 2.

In examining the recreation setting for the Project Area, Alternatives 1 and 5 would not result in any noticeable change. Alternatives 6 and 4 would be similar in that there are no roads proposed, but both propose visible harvest that may detract from some peoples' recreation experiences. Alternative 2 and 3 would have the most impact, based on the roads and noticeable harvest proposed in these alternatives.

Issue 2: Timber Supply and Economics

This issue relates to the economic viability of proposed timber sales, and the potential employment and revenues generated by the project. Of the 17 million acres that make up the Tongass National Forest, approximately 5 million acres are considered productive old growth. The Forest Plan allocates approximately 576,000 acres as suitable for timber management.

2 Alternatives

Approximately 2688 acres of the 7358 acres of productive old growth in the Deer Island VCU are suitable and available for timber management, according to the Forest Plan.

People are concerned about the economic viability of the proposed timber sale. In the EIS, we compare alternatives under both a "high market" and a "low market" projection. Analysis of the action alternatives harvest economics under a high market scenario indicates that Alternative 2 is the most economically viable. Alternatives 3-6 would have similar stumpage values under a high market condition. Under a low market scenario, Alternative 2 is the most economically viable primarily because it has the highest amount of cable yarding and the lowest amount of helicopter yarding, which results in the lowest average logging costs. Alternative 3 would have the lowest stumpage under low market conditions because the low amount of cable yarding does not offset the cost of road construction.

All alternatives produce positive stumpage returns in both the "high" and "low" markets as shown in Table 2-7. Actual stumpage returns are very difficult to predict, and the values displayed should be considered relative comparisons of alternatives, rather than definitive predictions of actual returns.

People are concerned about the potential employment and revenues generated by the project. Alternative 2 provides the most potential for employment, followed in order by Alternatives 4, 5, 3, 6 and 1. Alternative 2 provides the highest monetary return to the State of Alaska (through the 25% Fund Act of 1908), followed in order by Alternatives 3, 4, 5, 6 and 1. Alternative 4 provides the highest net value to the public (based on expected costs to implement, and average returns to the public), followed in order by Alternatives 2, 6, 5, 3 and 1. Alternative 2 has the highest annual road maintenance cost, followed by Alternative 3. The other alternatives have no annual road maintenance cost (no proposed road construction).

Issue 3: Biodiversity and Wildlife Species of Concern

Deer Island is 8329 acres. Alternatives examined in this EIS propose to harvest between 456 and 1345 acres on the island in treatments which vary in intensity from clearcuts to partial cuts. The relatively small size of Deer Island calls for careful consideration of timber harvesting effects on biodiversity in general and on wildlife species of concern. Unlike what may occur on larger islands or the mainland, many species cannot easily move or shift locations if the quantity or quality of habitat within the project area is reduced.

Under the Forest Plan, Deer Island is surrounded by a variety of development and non-development LUDs (see Figure Intro-1, page 3-3). The conservation biology strategy, including wildlife viability, on the Tongass is dependent on well-designed large, medium and small old-growth reserves and also on connectivity and how the matrix is managed over time. Biologists involved with this project agree that the north reserve holds the highest wildlife values of the three options considered for placement of the old-growth habitat reserve within VCU 525. This recommendation was made after consultation with the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game. Alternative 5 and 6 contain the north reserve option, and therefore rank higher than Alternatives 4, 3 and 2 with this measure.

In examining additional effects to overall biodiversity, Alternatives 5, 6 and 1 have the least amount of impact. Alternatives 5, 6, 3 and 1 have the least effect on medium-high volume habitats. Alternative 5 retains more forest structure with this entry and in the future but treats more acres than Alternative 6. Alternative 6 uses an "ecological approach" by considering natural wind disturbance patterns in the design of harvest units. Alternatives 2 and 4 would have a higher impact to overall biodiversity and old-growth this entry based on the combination of prescriptions and number of acres treated.

People have specifically asked us to take a close look at endemic mammals, goshawks, wolves and deer (with regards to subsistence). Alternatives 1 and 5 do the best at addressing the needs of these species by retaining forest structure now and in the future. Although Alternative 5 treats the most overall acres, it retains 65-75% of the structure within those acres, and does not create any large openings. Alternative 6 closely follows 5 by harvesting on fewer acres and using an ecological approach to design harvest units. Alternatives 2 and 3 are less desirable for species that are sensitive to road density. Alternatives 1, 5 and 6 will have fewer impacts to wildlife species of concern followed by 3 or 4 (similar rank) and 2.

Issue 4: Roads and Access Management

Deer Island is currently unroaded. Building roads in previously unroaded areas is of national concern, in addition to being a local issue. While some people would like to see no roads constructed in the project area, others would like to see roads built for recreational and hunting opportunities, as well as for timber harvest reasons. According to the Record of Decision for the Forest Plan, 90% of all currently unroaded lands on the Forest will still be roadless at the time of the next Forest Plan Revision (USDA, 1997b).

Alternatives 1, 4, 5 and 6 construct no roads, keeping the island in an unroaded condition. Alternative 3 would construct 3 miles of specified road and 1 mile of temporary road. Alternative 2 would construct 6 miles of specified road and 3 miles of temporary road.

Alternative 2 proposes road construction through a very difficult area referred to as "the switchbacks." As described in the Transportation section of Chapter 3, there is a high risk of slope failure associated with construction of this segment of road.

Following harvest, in both Alternatives 2 and 3, all roads beyond the first two miles of the mainline road (Road 6700) would be decommissioned, with physical removal of drainage structures. The mainline road would remain intact for the first two miles, with drainage structures remaining in place. However, the road would be closed to motorized traffic through installation of a gate near the LTF and an administrative closure order. The LTF would also be decommissioned, with the bulkhead and rock ramp removed.

Table 2-7 on the next page compares treatment acres, predicted harvest volume and environmental impacts for each of the action alternatives. It is important to note that differences in harvest prescriptions would result in different harvest volumes per acre. The environmental impacts are discussed in detail in each resource section in Chapter 3.

2 Alternatives

Table 2-7
Alternative Comparison Table

	Alt 1 No Action	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Total Acres Classified as Available for Harvest ¹	2688	2745	2745	2745	2513	2513
Proposed Treatment Acres ²	0	785	642	738	1345	692
% of Available Treated	0	29%	23%	27%	54%	28%
Proposed Harvest Acres ³ (including ROW ⁴)	0	689	456	689	1345	475
% of Available Harvested	0	25%	17%	25%	54%	19%
% of Total Productive Forest ⁵ (7358 acres) Harvested	0	9%	6%	9%	18%	6%
Harvest by Volume Strata (acres, including ROW)						
Low Volume (1172 acres existing)	0	75	45	70	165	48
Medium Volume (4295 acres existing)	0	366	229	382	812	322
High Volume (1891 acres existing)	0	248	182	237	368	105
Harvest by Management System (acres)						
Even-aged	0	121	42	0	0	107
Two-aged	0	551	374	672	0	340
Uneven-aged	0	17	40	17	1345	28
Total Volume (MMBF)	0	15.6	10.5	15.0	12.1	10.3
Cable Yarded	0	8.0	2.6	0	0	0
Helicopter Yarded	0	6.9	7.6	15.0	12.1	10.3
ROW Volume	0	.7	.3	0	0	0
Net Stumpage (\$/MBF)						
Under High Market Conditions	0	\$191	\$154	\$155	\$157	\$157
Under Low Market Conditions	0	\$43	\$6	\$15	\$31	\$9
Number of Direct Jobs Produced During Life of Sale	0	100	68	96	78	66
Specified Road (miles)	0	6.25	3.10	0	0	0
Temporary Road	0	3.11	1.04	0	0	0
Total Road Miles	0	9.36	4.14	0	0	0
Road Density (miles of road/sq. mile)	0	.6	.3	0	0	0
Log Transfer Sites	0	2	2	1	1	1
Sort Yard Sites	0	1	1	0	0	0
Visibility Ranking (1 = least visible change, 6 = most visible change)						
From Frosty Viewpoint	1	6	5	4	2	3
From Seward Viewpoint	1	6	4	5	2	3
From Santa Anna Viewpoint	1	6	3	4	2	5
From South Ernest Viewpoint	1	4-5	3	4-5	2	6
From North Ernest Viewpoint	1	5-6	5-6	4	2	3
ROS Class (% of Project Area)						
Semi Primitive Non-Motorized	11%	0	0	0	11%	0
Semi Primitive Motorized	52%	30%	30%	30%	52%	40%
Roaded Modified	37%	70%	70%	70%	37%	60%
% of High Value Deer and Marten Habitat in Project Area That Remains Unharvested						
Deer (336 acres existing)	100%	100%	100%	100%	98%	99%
Marten (1395 acres existing)	100%	79%	82%	83%	80%	92%
Drainage Structures on Fish Streams	0	1	1	0	0	0
Volume Through North LTF (MMBF)	0	13.2	6.6	0	0	0
Volume Through West LTF (MMBF)	0	1.3	0	1.3	1.9	1.7
Volume to Barge (MMBF)	0	1.1	3.9	13.7	10.2	8.6

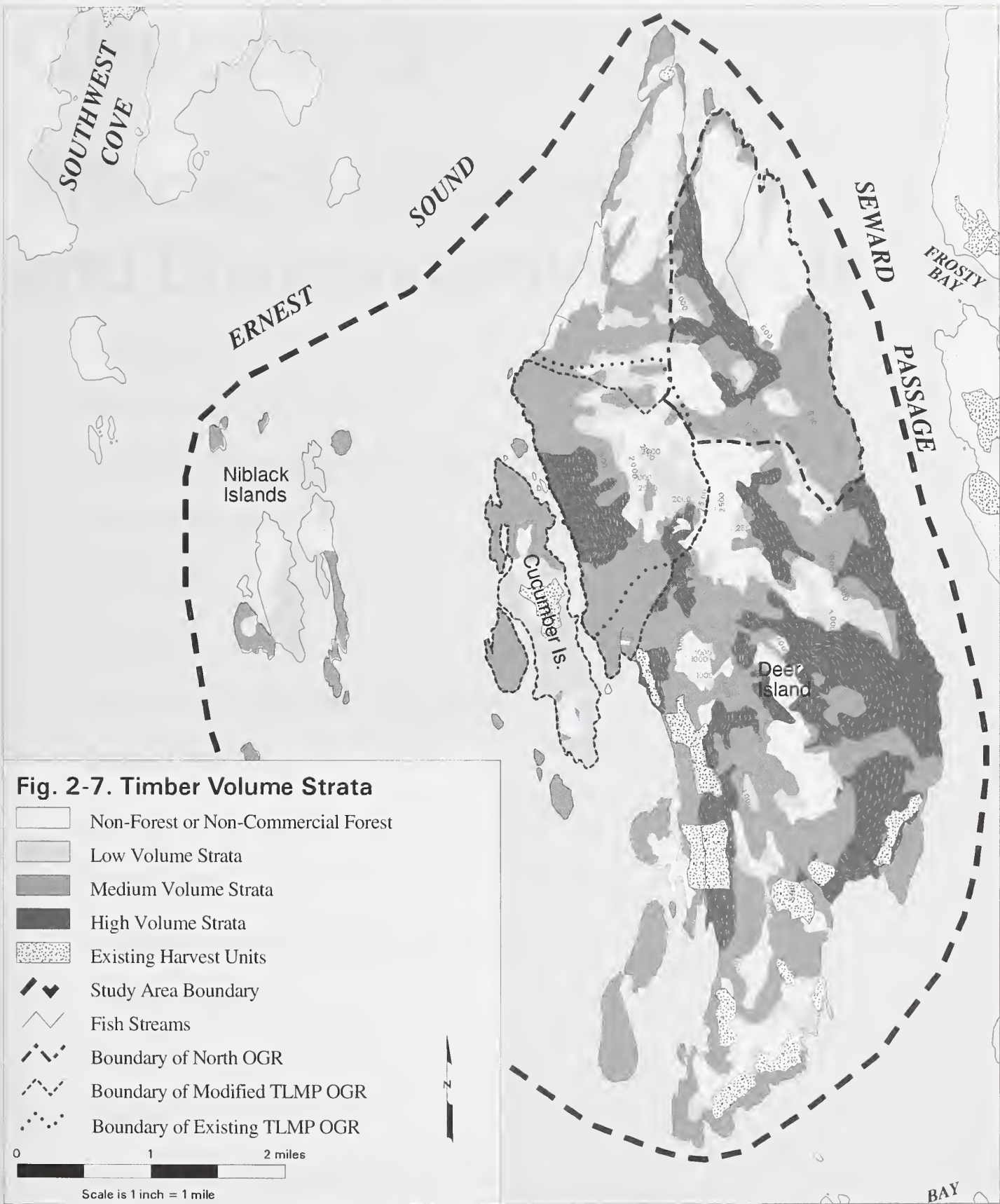
¹ Acres available vary by alternative due to alternative old-growth reserve placements.

² Proposed **treatment** acres are total acres (including reserves) within stands where harvest is proposed.

³ Proposed **harvest** acres are the acres that would actually be cut within stands where harvest is proposed.

⁴ ROW is Right-of-Way clearing for road construction (only in Alts. 2 and 3).

⁵ Productive Forest is forest land with at least 8000 board feet/acre or capable of growing 20 cubic feet of wood fiber per acre per year.



Chapter 3

Affected Environment and Environmental Effects

Introduction

Biodiversity and Old-growth

Fisheries, Watershed and Marine Resources

Heritage Resources

Recreation

Scenery

Silviculture and Timber Management

Socioeconomics

Soils

Subsistence

Threatened and Endangered Species

Transportation

Wetlands

Wildlife

Other Environmental Considerations

Chapter 3

Affected Environment and Environmental Consequences

Introduction

This chapter provides information concerning the existing environment of the Kuakan Project Area, and potential consequences to that environment. It also presents the scientific and analytical basis for the comparison of alternatives presented in Chapter 2. Each resource potentially affected by the proposed action or alternatives is described by its current condition and uses.

Following each resource description is a discussion of the potential effects (environmental consequences) to the resource associated with the implementation of each alternative. All significant or potentially significant effects, including direct, indirect, and cumulative effects, are disclosed. Effects are quantified where possible, and qualitative discussions are also included. The means by which potential adverse effects will be reduced or mitigated are described.

The discussions of resources and potential effects take advantage of existing information included in the 1997 Tongass Land and Resource Management Plan (Forest Plan) FEIS, other project EIS's, project-specific resource reports and related information, and other sources as indicated. Where applicable, such information is briefly summarized and referenced to minimize duplication. The planning record for the Kuakan Project includes all project-specific information, including resource reports, the watershed analysis, and other results of field investigations. The record also contains information resulting from public involvement efforts. The planning record is located at the Wrangell Ranger District Office in Wrangell, Alaska, and is available for review during regular business hours. Information from the record is available upon request.

Land Divisions

The land area of the Tongass National Forest has been divided in several different ways to describe the different resources and allow analysis of how they may be affected by Forest Plan and project level decisions. These divisions vary by resource since the relationship of each resource to geographic conditions and zones also varies. The allocation of Forest Plan Land Use Designations (discussed in Chapter 1) is one such division. Two divisions important for the present effects analysis are described briefly here.

Value Comparison Units (VCU's)

These are distinct geographic areas, each encompassing a drainage basin containing one or more large stream systems. The boundaries usually follow major watershed divides. The Kuakan Project Area encompasses all of VCU number 525 as discussed in Chapter 1.

Analyzing Effects

Wildlife Analysis Areas (WAA's)

These are Forest Service land divisions that correspond to the "Minor Harvest Areas" used by the Alaska Department of Fish and Game. Approximately 190 apply to the Tongass National Forest. WAA 1902 includes the Kuakan Project Area. Information estimated by WAA is used in the wildlife and subsistence analyses.

Environmental consequences are the effects of implementing an alternative on the physical, biological, social and economic environment. The Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA) include a number of specific categories to use for the analysis of environmental consequences. Several are applicable to the analysis of the proposed project and alternatives, and form the basis of much of the analysis which follows. They are explained briefly here.

Direct, Indirect and Cumulative Effects

Direct environmental effects are those occurring at the same time and place as the initial cause or action [40 CFR part 1508.8]. Indirect effects are those that are caused by the action and occur later in time or are spatially removed from the activity, but are still reasonably foreseeable. Cumulative effects result from incremental effects of actions, when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time [40 CFR part 1508.7].

We considered cumulative effects of past and present projects in the area, but such activities are not likely to lead to significant cumulative effects beyond those disclosed in this EIS. The uplands adjacent to Ernest Sound and Seward Passage have an assortment of Forest Plan Management Prescriptions, including Wilderness, Old-growth Reserve, Scenic Viewshed, Modified Landscape and Timber Production (see Figure Intro-1 on page 3-3).

Within this landscape, there have been several timber sales in the recent past. To the east, across Seward Passage from Deer Island, about 1181 acres were harvested by cable and helicopter in the Frosty Bay Timber Sale in 1992-93. On the southern end of Deer Island, approximately 456 acres were harvested by helicopter in 1989-90. In the Canoe Pass area of South Etolin, approximately 90 acres were harvested by A-frame in 1972-74, prior to establishment of the South Etolin Wilderness.

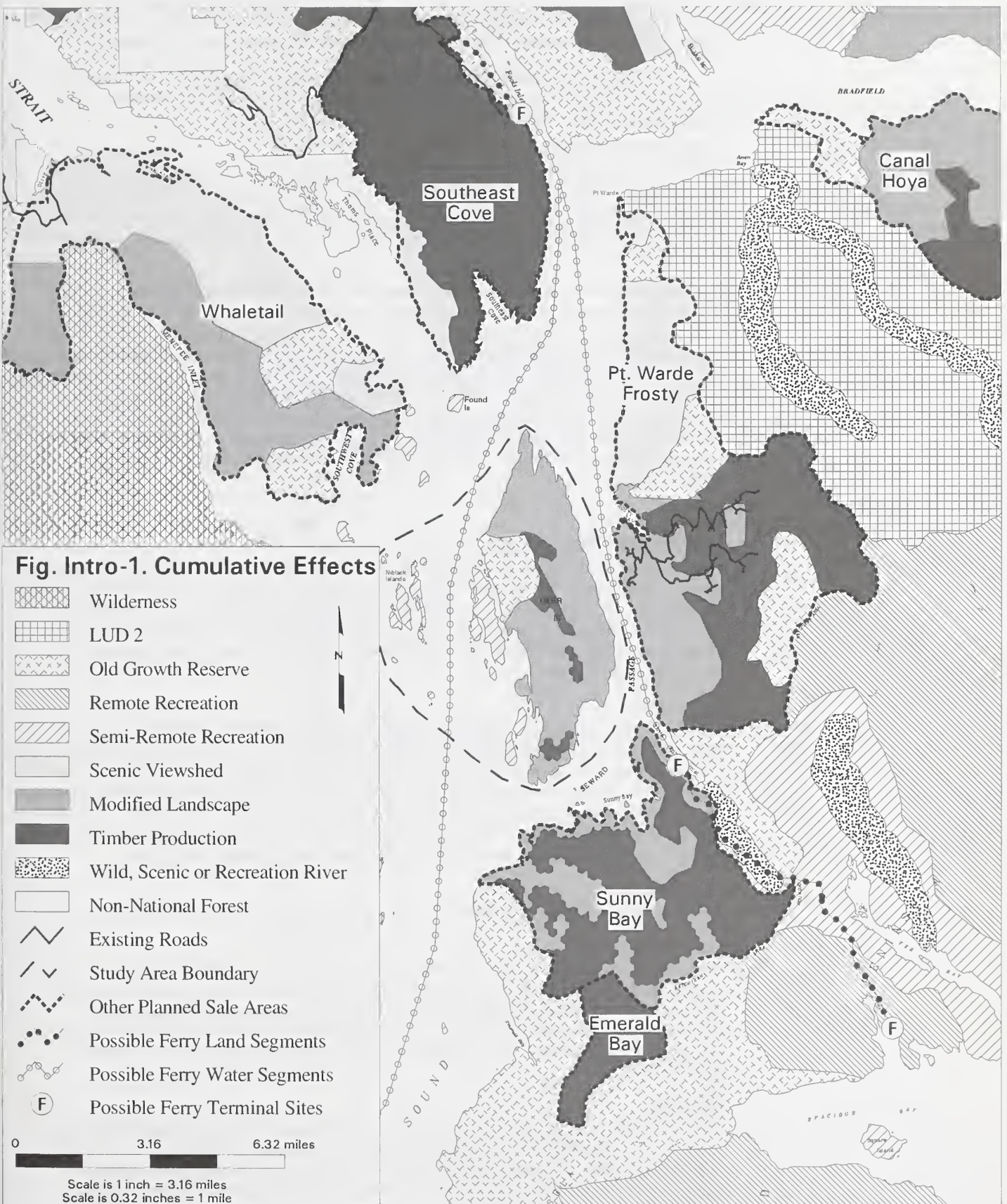
A Record of Decision for the Canal Hoya Timber Sale, located on the mainland about 13 miles northeast of Deer Island, has recently been published. The Canal Hoya Timber Sale proposes harvest on approximately 660 acres in the Bradfield Canal area.

The Wrangell Ranger Districts 10 year action plan lists possible future sales within the Ernest Sound landscape as follows:

AREA	SALE NAME	SALE SIZE	YEAR
Sunny Bay	Sunny Bay	10 MMBF	2006
Point Warde/Frosty	Point Warde	10 MMBF	2006
Southwest Cove	Whaletail	15 MMBF	2007
Southeast Cove	Fools	10 MMBF	2009

The Ketchikan Ranger District is currently planning the Emerald Bay Timber Sale, on the Cleveland Peninsula, south of Sunny Bay. All of these possible timber sale project areas are shown on the Cumulative Effects Map (see Figure Intro-1 on page 3-3).

Another project that could have impacts in the Ernest Sound area would be implementation of the Southeast Alaska Transportation Plan. The Transportation Plan proposes a new ferry terminal near Fools Inlet on Wrangell Island and daily ferry travel between the new terminal and Ketchikan or possibly a new terminal in Santa Anna Inlet. Both Ernest Sound and Seward Passage could have increased marine traffic, resulting in Deer Island being viewed by more people. Both of these marine routes are already designated as Visual Priority Travel Routes in the Forest Plan, and all alternatives for the Kuakan Timber Sale meet or exceed the



3 Environment and Effects

Forest Plan standards and guidelines for visual quality. The State of Alaska, Department of Transportation is the agency responsible for the Southeast Alaska Transportation Plan.

None of the projects listed above are considered connected actions in relation to this project. Each project will have its own environmental analysis, as required by the National Environmental Policy Act (NEPA).

Available Information

Much of the Tongass National Forest resource data resides in an electronic database formatted for a geographic information system (GIS). We use GIS software to assist in the analyses of these data. GIS data is available in tabular (numerical) format, and as plots displaying data in map format. For this EIS, all the maps, and most of the numerical analyses, are based on GIS resource data.

There is less than complete knowledge about many of the relationships and conditions of wildlife, fish, forests, jobs and communities. The ecology, inventory and management of a large forest area is a complex and evolving science. The biology of wildlife species prompts questions about population dynamics and habitat relationships. The interaction of resource supply, the economy, and communities is the subject matter of an inexact science. However, the basic data and central relationships are sufficiently well established in the respective sciences for the deciding official to make a reasoned choice between the alternatives, and to adequately assess and disclose the possible adverse environmental consequences. New or improved information would be very unlikely to reverse or nullify these understood relationships.

Unaffected Resources

Several resources and uses of the Project Area are likely to remain unaffected by the proposed action or alternatives, or will not be affected to a significant degree. Even though significant effects are not anticipated, most of these resource are discussed in the sections of this chapter which follow the introduction, to the extent that measurable effects or differences between alternatives are present. Resources or uses for which no measurable effects were identified are discussed briefly here.

Air Quality

All of the action alternatives will have limited, short-term effects on ambient air quality. Such effects, in the form of vehicle emissions and dust, are likely to be indistinguishable from other local sources of airborne particulates, including other motor vehicle emissions, dust from road construction and motor vehicle traffic, residential and commercial heating sources, marine traffic, and emissions from burning at sawmills. The action alternatives could result in short-term supplies of raw wood products to local mills. It is the responsibility of the mill owner or sort yard operator to ensure that mill emissions are within legal limits.

Facilities

There are no logging camps or Forest Service administrative sites in the Kuakan Project Area.

Land Status

Under the Alaska Statehood Act of 1959, the State of Alaska is entitled to a certain amount of Federal land. The State was also allowed to identify for selection more acreage than would ultimately be conveyed to State ownership. Other legislation granted Alaska Native corporations similar selection rights. There are no State of Alaska, nor Alaska Native land selections or claims within the Kuakan Project Area. All land within the project area is National Forest Land.

Minerals

There are no known mineral occurrences of commercial value within the Kuakan Project Area. The proposed activities would have no direct or indirect impact on mineral resources. In general, the project could affect mining activities only by providing easier access for mapping and surveying due to possible road construction in undeveloped areas under

Alternative 2 or Alternative 3. Geologic mapping could be enhanced by increased exposure due to road construction and quarry development.

Unavoidable Adverse Effects

Implementation of any action alternative would cause some adverse environmental effects that cannot be effectively mitigated or avoided. Unavoidable adverse effects often result from managing the land for one resource at the expense of the use or condition of other resources. Many adverse effects can be reduced, mitigated, or avoided by limiting the extent or duration of effects. The interdisciplinary procedure used to identify specific harvest units and roads was designed to eliminate or lessen the significant adverse consequences. The application of Forest Plan standards and guidelines, Best Management Practices, project-specific mitigation measures, and monitoring are all intended to further limit the extent, severity, and duration of potential effects. Such measures are discussed throughout this chapter. Regardless of the use of these measures, some adverse effects will occur. The purpose of this EIS is to fully disclose these effects.

The remainder of Chapter 3 is organized alphabetically by resource. Each resource section describes the Affected Environment as it pertains to that resource, then discloses the Environmental Consequences of the alternatives. The sections are:

- Biodiversity and Old growth
- Fish, Watershed and Marine Resources
- Heritage Resources
- Recreation
- Scenery
- Silviculture and Timber
- Socioeconomics
- Soils and Geology
- Subsistence
- Threatened and Endangered Species
- Transportation
- Wetlands
- Wildlife
- Other Environmental Considerations

Organization of Chapter 3

3 Environment and Effects

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Biodiversity and Old-growth

Affected Environment

The National Forest Management Act (NFMA[36 CFR 219]) requires that the Forest Service provide for a diversity of plants and animals, based upon the suitability and capability of each National Forest, as a part of meeting overall multiple-use objectives (16 USC 1604(g)(3)(B)). Biodiversity can be defined as the distribution and abundance of all of the plant and animal communities and species within an area, or as the variety of life and associated ecological processes. As an example of one scale and type of diversity: the Tongass provides habitat for 54 species of mammals, 231 birds and 5 amphibians. Maintaining biodiversity over time requires a close look at species viability.

Biodiversity and viability need to be assessed on a number of scales (global, regional, local). On a global scale, 56% of the world's temperate rain forests remain undeveloped and 29% of the remaining unlogged acreage is within the Tongass (USDA Forest Service, 1997a). These figures may explain why there is a high level of outside interest in the management of the Tongass.

An ecosystem approach was applied to subdivide the Tongass National Forest into 21 unique ecological provinces. The area that includes the timber sale we are proposing has been classified as a part of the Revilla Island/Cleveland Peninsula province (USDA Forest Service, 1997a). This province is characterized by a variable climate with warm and wet conditions predominating on land nearest the outer coast and much colder conditions near the mainland.

Broad questions of biodiversity and viability on the Tongass were addressed in the Forest Plan. The old-growth habitat strategy is comprised of two key components. The first is a forest-wide system of reserves designed to protect the integrity of the existing old-growth ecosystem. The reserve system includes three components; 1) all non-development LUD's, 2) a series of mapped large, medium and small Old-growth Reserves, and 3) full protection of all islands smaller than 1,000 acres. The second key component is the set of standards and guidelines that apply to the development LUD's where commercial timber harvest is permitted. These include things like the 1000-foot beach and estuary buffer, riparian buffers, open road density limits to reduce risk to wolf viability, and 200 year rotations in specific wildlife analysis areas (USDA, 1999).

This document examines specific aspects of biodiversity as it relates to Deer Island and relies on Forest Plan standards and guidelines in relation to species viability questions which cannot be answered on a project level. Table OG-5 near the end of this section displays the current acreage classification for lands within the Kuakan project area. It is important to note that over 60% of the productive old growth in the project area is protected from timber harvest now and in the future through LUD designation or Forest Plan standards and guidelines for beach and riparian buffers and oversteepened slopes. Additional standards and guidelines and unit-specific prescriptions often result in additional retention within the matrix of forest land that is available for timber harvest.

We looked at the effects on the conservation biology strategy associated with Deer Island and this project by: 1) measuring changes in acres of old-growth habitat by alternative, 2) comparing differences in the amount of forested structure left within harvest units, 3) assessing the ability of old-growth reserves and corridors to meet wildlife needs and by 4) looking at cumulative effects for the ecological province and the island. The Wildlife and TES sections of this document add to this analysis.

Old-growth Habitat Strategy

High Value Habitats

Coarsely structured (multi-age, large trees..), low elevation forest is believed to be important for several wildlife species including deer, goshawks and forest songbirds. In general, forest volume does not correlate well with forest structure, which is ultimately believed to be the habitat feature of importance to "old-growth" associated wildlife species. A forest structure classification system is being developed for the Tongass but as of this date it is incomplete. High volume forest (measured in our analysis) incorporates the majority of the coarse-structured forest stands on Deer Island.

Salmon streams are important to many wildlife species in Southeast Alaska. Salmon were found to provide up to 94% of the carbon and nitrogen assimilated by coastal brown bears (PNW 1997). Mink have a delayed reproduction cycle which coincides with the return of spawning salmon. Because Deer Island is relatively small and steep, it supports very little salmon habitat. Important fish streams on Deer Island include Canyon Creek (north end of Deer Island) and Bear Creek (south end of Deer Island). There is little high value riparian habitat but some can be found at the upper end of Canyon Creek and within the beach buffer near Bear Creek and Lazy Creek. The high value floodplain-type riparian habitat associated with Bear Creek was harvested in 1989 (see Fig. OG-1).

Other unique habitats include a small freshwater lake on the north end and young second-growth stands on the south end. We recorded several game trails near the lake and nesting waterbirds (Red-throated Loons and Mew Gulls). There appeared to be more deer sign within the young second-growth stands in 1998 than in forested stands. These stands have not reached the stem exclusion stage yet whereupon they will become less suitable for deer foraging.

Forest Structure

Wind is a major disturbance factor in Southeast Alaska, altering the structure of the forest. The disturbance can be thought of in two forms: small-scale and large-scale, though in reality it is a continuum. Small scale disturbances are when individual trees, or small group of trees, blow over during wind storms, opening the canopy and allowing young trees, or newly germinated seedlings to grow and fill the openings. Large-scale events are when entire stands are blown down and an even-aged stand replaces the stand that was blown over. The magnitude of the disturbance depends on the exposure of the stand to predominant storm path winds. Major storms in southeast Alaska are the result of low pressures building off-shore, and development of hurricane winds as the storms move north. Slopes with a southern aspect on Deer Island are more subject to these storms than north facing slopes.

Recent windthrow disturbance (1978 storm) is apparent on the southeast side of Deer island. Stands with a southerly aspect (south, southeast, and southwest) on the island show signs of wind disturbance, more so than those with a northerly aspect. Based on stand characteristics it is believed that windthrow on Deer Island has created moderate to small openings (generally less than 10 acres). Sampling was not intensive enough to determine the extent of the windthrow disturbance across the island, though it is assumed that numerous small patches created by individual storm events, has created multi-cohort stands in areas exposed to storm winds. Forest management that emulates natural stand processes is expected to create less environmental impact over time. Designing harvest units to create stand conditions similar to what might be created by natural disturbance is one method to achieving this means while still producing timber products for societal needs.

The positive and negative aspects of each forest successional stage for wildlife depends on the species considered. Following clearcutting, a forested stand will offer some benefits to wildlife while in the stem initiation phase by providing forage. When a stand reaches the stem exclusion phase in 15 to 25 years its benefits to several wildlife species drop dramatically and may remain poor for 140 years or more. Thinning the stand to a wide spacing increases the amount of light that penetrates the closed canopy allowing the understory shrubs and herbaceous species to maintain site occupancy.

Some of the old growth vegetation components that benefit wildlife include standing and downed dead trees, high canopy cover and large diameter trees. Snags (standing dead trees) are a critical habitat component for cavity nesting birds and mammals. High canopy cover is generally associated with higher volume stands and serves to intercept snow, thus improving the availability of forage for deer. Large diameter trees provide large limbs that can be used as nesting platforms by raptors and murrelets. Marten use the spaces under the snow below the edges of large logs for hunting and travel routes. Nesting and foraging birds make use of the cavities and loose bark found on dead or dying large diameter trees.

Corridors

Low elevation passes, beach fringe and stream corridors provide natural connections between forested blocks and are important areas for migratory wildlife species. These areas can become “pinch-points” to wildlife species if they provide the only migratory route between two blocks of forest. Corridors along slopes allow for the seasonal movement of certain wildlife species between summer and winter range. Corridors can be protected by not harvesting within them or by managing the habitat to retain forest structure (Suring et al. 1993).

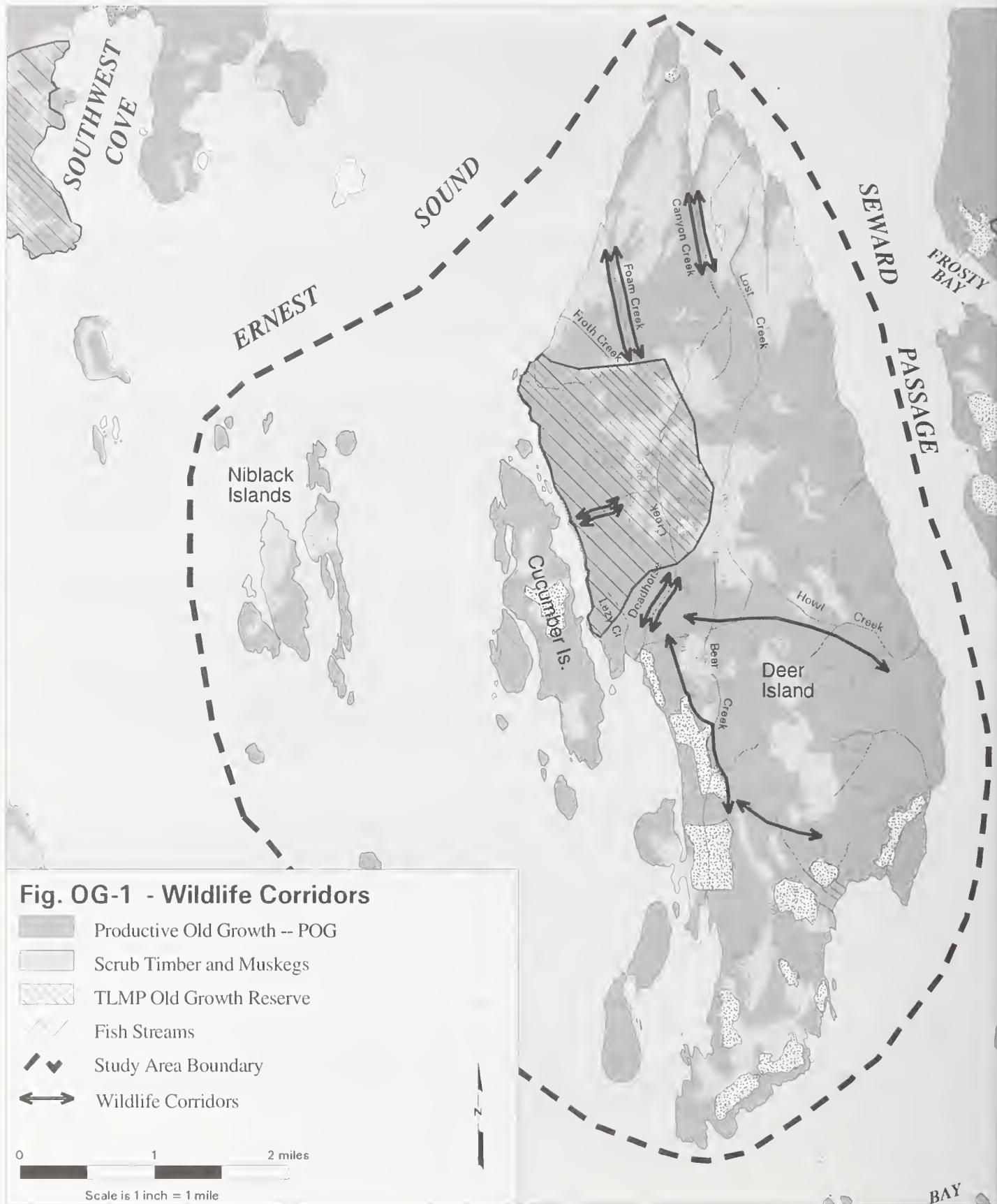
The beach fringe is believed to be important as a wildlife travel corridor, as a transition zone between interior forest and salt water influences, and as a unique habitat (or micro-climate). The beach fringe provides important low-elevation connectivity between watersheds that are separated by very steep sides and non-forested ridgetops. In conjunction with riparian areas, which provide connectivity within watersheds, the beach fringe is a component of the major travel corridor system used by many resident wildlife species. The beach fringe is also thought to provide important avian migratory habitat, particularly for neotropical migrants. (Forest Plan 1997)

Due to its size there are only a few forested corridors in addition to the beach fringe on Deer Island (see Fig. OG-1). The center of the island is a high elevation, unforested area which probably restricts movement by some animals to the outside/beach fringe forest. The southern edge of the TLMP Old-growth Reserve contains well-used game trails as does a stream corridor in the southeast (Fig. OG-1). Biologists in 1984 identified corridors along a northwest riparian stream (see Fig. Water-1, Foam Creek). This area was not heavily used in 1997-1998 probably due to a lower deer population but is considered an important potential corridor in this analysis (see Wildlife section, Deer). Canyon Creek on the north end was also identified as an important corridor historically and we saw evidence of this in our field work the last two seasons (Waters, 1984).

Proposed Old-growth Reserves

As stated earlier, Old-growth Reserves are part of the forest-wide strategy to maintain viable wildlife populations and diversity on the Tongass. A system of large (40,000 acres), medium (10,000 acres) and small (1600 acres per 10,000 acre watershed) reserves have been mapped across the Tongass. Panelists reviewing drafts of the Forest Plan concluded that reserves by themselves were not enough to maintain viability, and additional measures were included in the final Forest Plan Decision. Other critical factors for retaining wildlife populations include: alternative harvesting, longer rotations and residual trees left in clearcuts to maintain lichens, mosses, fungi and other species (USDA, 1999).

Small Old-growth Reserves are required to be a certain size and contain a certain amount of productive old growth. The Forest Plan specifies that the size of these reserves must be 16% of the VCU (Value Comparison Unit) size. Within each small reserve, half of the acres must exist as productive old growth. The northern flying squirrel and the marten were species of concern that were considered in developing standards for the small Old-growth Reserves across the Tongass (Suring et al. 1993).



Based on these criteria, a small reserve was located on Deer Island at the Forest Plan level. South-facing slopes and proximity of other reserves were the main criteria determining the current location of the Deer Island reserve (the TLMP reserve). The TLMP reserve is approximately 400 acres shy in total size but meets the requirement for productive old growth (Table OG-1).

Aside from these general criteria, the design of each reserve should be based on the wildlife concerns specific to the area (Iverson, pers. comm). Criteria that are commonly used in designing small reserves include: important deer winter range, probable goshawk nesting habitat, probable murrelet nesting habitat, large forest blocks, rare plant associations and landscape linkages (USDA Forest Service, 1997b). The Forest Plan states that "in designing small reserves, include consideration of landscape linkages between larger reserves."

This report will analyze two reserve options for Deer Island, in addition to the TLMP original Old-growth Reserve (see Fig. OG-1 and OG-2). The Deer Island Revised TLMP Reserve is an expansion of the TLMP Reserve in order to meet the size criteria and include an important wildlife corridor. The North Reserve was designed after discovering important habitat for several key species of interest. Table OG-1 lists the acres required and the acres that exist within the reserve as mapped. The "Suitable POG" column refers to acres of productive old growth that would be removed from the suitable timber base if they were included in a designated Old-growth Reserve. The existing reserve, for example, contains 416 acres of productive old-growth that would be considered suitable for timber harvest were it not within the old-growth reserve.

Table OG - 1
Size and Productive Old Growth (Volstrata = L, M, H) in acres for Deer Island
Small Old-growth Reserve Options

	Size (acres)	low volume strata	medium volume strata	high volume strata	Total POG	Suitable POG
Reserve Requirements	1526	NA	NA	NA	763	NA
TLMP Reserve	1141	147	534	250	931	416
Revised TLMP Reserve	1739	144	1073	254	1471	358
North Reserve	1564	131	565	303	999	655

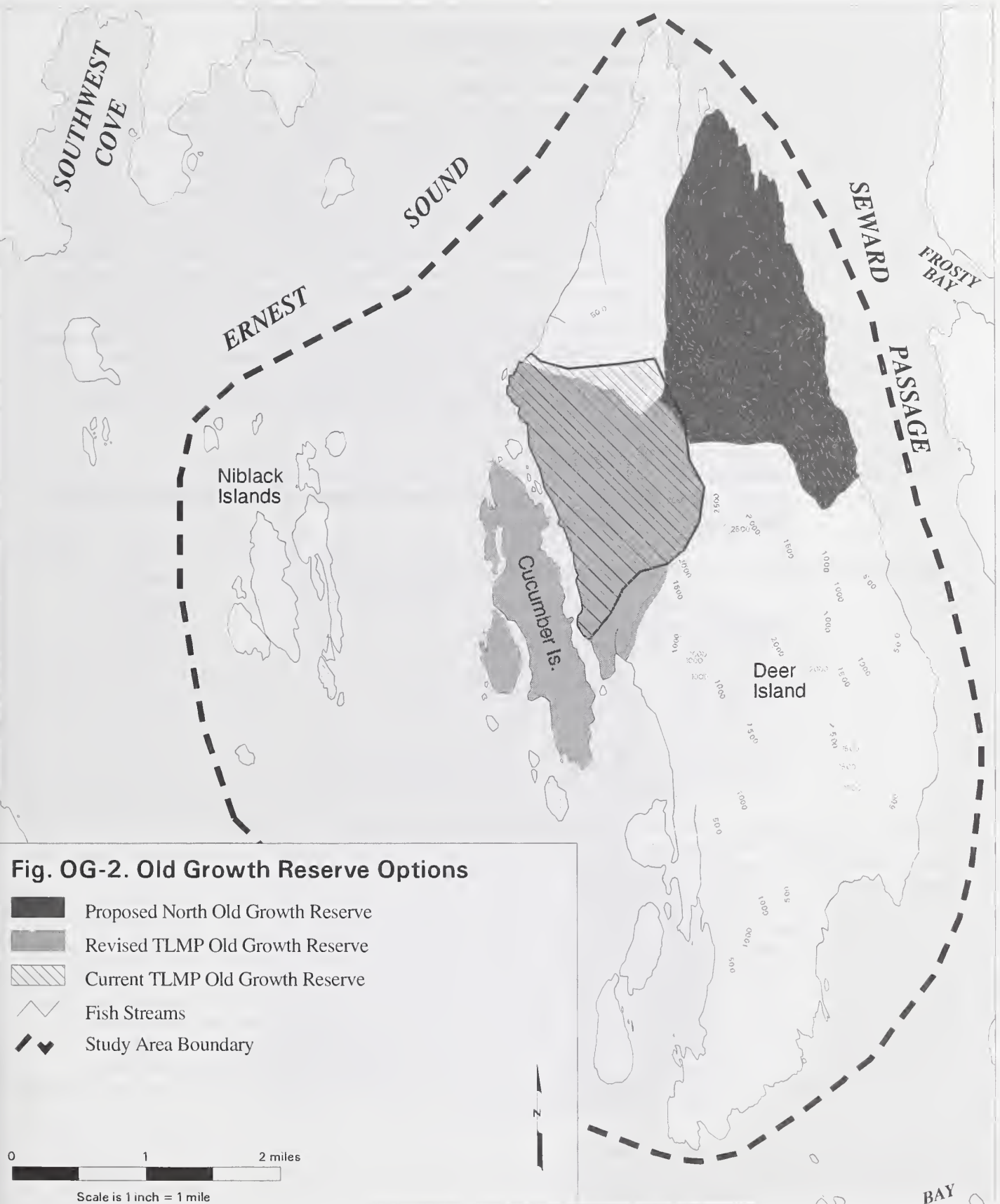
The key wildlife benefits of the **TLMP Reserve** are the south-facing slopes and high value deer winter range. There is some benefit in its proximity to the set of smaller islands (Cucumber Island) to the west due to the fact that there is a land bridge between these islands at low tide. Historical accounts lead us to believe that deer cross from Deer Island to Cucumber Island during the winter, however the majority of the high value deer winter range based on our models is located in the beach fringe of Deer Island. The wildlife sign that we have seen in the reserve includes bear, grouse, river otter, deer and wolf. The muskeg system at the top of this reserve and the other reserve options received a lot of use by large game recently and in past surveys (Waters 1984). This reserve is equally spaced between other small reserves on Etolin and the Mainland, however, species traveling between reserves will have to cross a substantial body of water. In addition to not meeting minimum size standards, a negative aspect of this location is that it exists on the steepest section of the island and may hold little value for species sensitive to this such as goshawks. It contains no important riparian zones and is fairly one-dimensional, i.e. there is not a lot of diversity in habitat types. This reserve has been revised in all alternatives in order to meet Forest Plan standards.

The **Revised TLMP Reserve** meets the Forest Plan Standards and retains the wildlife benefits of the original reserve, but adds the nearby islands and important wildlife habitat to the south. The north boundary of the original reserve is also modified to follow geographic features that can be located on the ground. The Forest Plan states that we are to "consider first, in any modification of mapped reserves, "non-development" Land Use Designations that maintain the integrity of the old-growth forest ecosystem." Using this direction we added the small islands to the reserve to meet the size criteria (currently classified as Semi-remote Recreation). After consultation with other wildlife agencies we also added an area to the south of the reserve to enhance the wildlife values of the reserve. The area to the south is believed to be a relatively important travel corridor for large game on the island, and contains a patch of high volume timber within the beach fringe. A Barred Owl was using this same area in 1998 but we were unable to locate a nest. We also discovered a bear day-use area near the beach. This reserve is a part of Alternatives 2, 3 and 4.

The **North Reserve** was designed after discovering species of special concern in the area and during consultation with other wildlife agencies. There was a desire expressed by the U.S. Fish and Wildlife Service to move the TLMP reserve into an area that was not as steep. Based on this input we designed the North reserve for a long list of wildlife reasons. In the summer of 1997 we discovered nesting goshawks on the north end of Deer Island. In 1998 we located this pair's alternate nest site approximately 1/2 mile from the previous nest. A third nest was located in the spring of 1999 (within 1/4 mile of the 1997 nest), but as of this writing, the success of that nest has not been determined. In 1998 we discovered important use areas for wolves. Marbled Murrelet surveys in 1997 recorded inland activity on the northeast shore indicating that birds were nesting in the area. Our surveys indicate wolves would benefit more from this old-growth reserve placement. Although this reserve lacks many south-facing slopes, we believe it contains patches of important deer winter range based on our field work and historical accounts (Waters, 1984). The North Reserve option encompasses many of the stands in which we recorded songbird Management Indicator Species -- the Hairy Woodpecker, the Brown Creeper and the Red-breasted Sapsucker (Bird Resource Report, 1998). The placement of the North Reserve results in the highest island-wide deer habitat capability over time, due to more acres of high value habitat remaining unharvested in the future (Table Wildlife-3 and Table OG-1). The forested stands within this reserve are defined as "gap-phase" old-growth as compared to the west side of the island which is typified by larger-scale wind events. The best fish-producing stream on the island and the best riparian habitat is located within this reserve.

Cumulative Impacts

Based on the most recent regional analysis, this province (Revilla/Cleveland Peninsula) was one of the ten "higher risk" areas for loss of biodiversity due to the harvesting that has occurred in the past. 6% of the productive old growth within this ecological province was harvested between 1954 and 1995 (USDA Forest Service, 1997a, FEIS part 1, pg 3-30). Approximately 84% of the productive old growth in this province and 80% of the highly productive old growth will remain in 2095. Concerns for biodiversity in the Forest Plan were addressed through the Old-growth Habitat Strategy that incorporates non-development LUD's and management of the matrix through application of Forest Plan standards and guidelines (USDA, 1999).



Effects of the Alternatives

Effects on High Value Habitats

We measure the effects on high value habitats using forest volume under the assumption that medium and high volume stands (derived from TIMSTRA model) are more likely to contain old-growth structure (large trees, downed logs...). Forest "volume" does not correlate well with forest structure but forest structure maps are still in the development stage (John Caouette, pers. comm.). Table OG-2 displays the harvesting within medium and high volume stands by alternative. There are currently 1172 acres of low, 4295 acres of medium and 1891 acres of high in the VCU, for a total of 7358 acres of productive forest land. Alternatives 3, 5 and 6 will have similar impacts on medium-high volume forest. Alternative 5 is believed to be a better alternative for species that respond negatively to the stem exclusion stage that develops approximately twenty years after clear-cut harvesting (deer, goshawks...). All alternatives are designed to maintain forest structure within units over the long term. Alternative 5 is designed to maintain more forest structure through uneven-aged management, retaining 65-75% of the unit volume following this entry. Alternatives 2 and 4 have the greatest impact on medium - high volume habitat this entry, due to the higher number of acres harvested. Alternative 6 is designed to emphasize harvest in stands that are naturally disturbed by wind.

Table OG - 2

Acres of Low, Medium and High Volume Productive Old-growth (POG) Harvested by Alternative for the Deer Island VCU

Volstrata	Total POG in project area	Alt 1	Alt 2 (ROW)	Alt 3 (ROW)	Alt 4	*Alt 5 (harvest equivalent acres)	Alt 6
Low	1172	0	61 (14)	37 (8)	70	165 (50)	48
Medium	4295	0	354 (12)	226 (3)	382	812 (244)	322
High	1891	0	244 (4)	181 (1)	237	368 (110)	105
Total	7358	0	659 (30)	444 (12)	689	1345 (404)	475

* All units in Alternative 5 retain 65-75% of the volume. Clearcut equivalent acres for Alt 5 are shown in parentheses.

High value habitat can also be defined as low elevation forests for some species. Examples of two species that utilize low elevation forests at certain times of the year are the Sitka black-tailed deer and the northern goshawk. Deer move to lower elevations during high snow conditions to find forage. Most goshawk telemetry relocations occur in low elevation productive old-growth. Table OG-3 displays the effects on productive old growth by elevation class for each alternative but does not take into account the harvest prescriptions. Alternatives 2, 3 and 5 manage more acres of low elevation forest (below 800 feet) than other alternatives. All alternatives harvest 2% or less of the productive old growth between 0 and 500 feet elevation. Alternative 5 harvests across more acres than other alternatives, but is designed to maintain more forest structure into the rotation through uneven-aged management, retaining 65-75% of the unit volume following this entry. Alternative 6 displays the least impact to low elevation forests for this entry with the most harvest occurring in the 1,201-1,500 elevation zone.

Table OG - 3

Percentage of Productive Old-growth Treated Within Each Elevation Class by Alternative*

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	**Alt 5	Alt 6
0-500	0%	2%	2%	2%	1%	.06%
501-800	0%	23%	24%	19%	31%	11%
801-1,200	0%	25%	20%	24%	49%	25%
1,201-1,500	0%	22%	14%	23%	43%	34%
>1,500	0%	5%	3%	5%	18%	8%

* These acres are the total harvest "treatment acres", i.e. there is no differentiation by harvest prescription.

** Alternative 5 retains 65-75% of unit volume but treats more acres.

Table OG-4 displays the difference in the amount of retention (forest structure) between alternatives. All alternatives provide alternatives to clearcutting. Most units in Alternatives 2, 3, 4 and 6 retain 10-25% of the volume within the units. The average retention in these four alternatives varies from 11% in Alt. 6 to 21% in Alt. 4. Alternatives 2 and 4 have more of an impact on forest structure this entry than Alternatives 3 and 6, because they treat more acres. Alternative 5 treats more acres but was designed to maintain more forest structure for visuals and small mammals (see Wildlife section). Through rotation, the acres harvested and the percentage of trees harvested over time tend to be affected by the old-growth reserve placement option selected.

Table OG - 4

Amount of Forest Structure Remaining Within Units this entry (% retention of volume) by Alternative

Alternative	% retention range	Average % retention
1	100	100%
2*	10-25	16%
3*	10-25	16%
4*	15-25	21%
5	65-75	70%
6*	10-25	11%

* A few units have higher retention to meet visual and wildlife concerns

Most of the harvest units in Alternative 6 are designed with consideration of stand disturbance history; specifically windthrow disturbance. Designing harvest units to emulate natural windthrow was complicated by the high amount of western red-cedar and yellow cedar which appear to be more resistant to windthrow than hemlock and Sitka spruce. General objectives were to create small canopy openings on wind-protected north-facing stands and leave a high amount of existing forest structure in place. On south-facing slopes stands would have substantially larger openings. Some residual structure would be maintained because natural forest disturbances such as windstorms are recognized to leave behind large legacies of trees, logs and snags, which greatly enrich the composition, functional capacity and structure of the regenerating stand (ecosystem). The residual trees on south-facing stands will be susceptible to windthrow. Using diameter-limit prescriptions that leave the smaller trees may reduce the amount of windthrow. However, some blowdown may be beneficial for soil productivity in areas with gentle slopes where erosion will not occur. Alternatives 2, 3, 4 and 5 did not specifically consider windthrow disturbance in unit design, however individual unit harvest prescriptions consider windthrow risk.

Alternatives 3, 5 and 6 would tend to lead to more frequent re-entry to Deer Island over time to harvest the total Forest Plan volume modeled from the area over rotation. The Forest Plan

modeled a 100 to 150 year rotation for lands in the Modified Landscape Prescription, which is what most of Deer Island is in. Harvest entries into the project area would probably occur every 10-20 years for Alternatives like 3, 5 and 6, based on similar volume entries staged over time. Alternatives 2 and 4 would tend to lead to longer time periods (20-30 years) between entries, if similar volumes were removed each entry over the rotation.

All alternatives will apply Forest Plan standards for protection of important riparian and fish habitat. The North Old-growth Reserve placement (included in Alternatives 5 and 6) incorporates Canyon Creek within the reserve boundary. While Deer Island is not considered an important fish producing system, Canyon Creek has the most riparian habitat and is the best fish-producing stream on the island. Alternatives 2 and 3 propose road-building within one-half mile of the freshwater lake on the north end. All Forest Plan standards will be met with habitat protection near this lake. Road development and harvest units have the potential to impact important wolf and goshawk habitat, triggering specific mitigation measures that incorporate buffers and timing restrictions (see Wildlife section). Young second-growth stands are currently being used by foraging deer. New harvest units will provide more forage and will continue to be used by the deer population at least during mild winters (see Wildlife section).

Effects on Corridors and Old-growth Reserves

All alternatives are designed to maintain forest structure within wildlife corridors (Fig. OG-1). The U.S. Fish and Wildlife Service has expressed a concern about the ability of the beach fringe on the west side to serve as a corridor due to past harvesting. We will retain a forested corridor of at least 500 feet above past harvest units to mitigate these effects. In addition to the stream buffers that will retain forested structure along many of the wildlife corridors, we are leaving structure within Units 1 and 12 to mitigate effects on corridors.

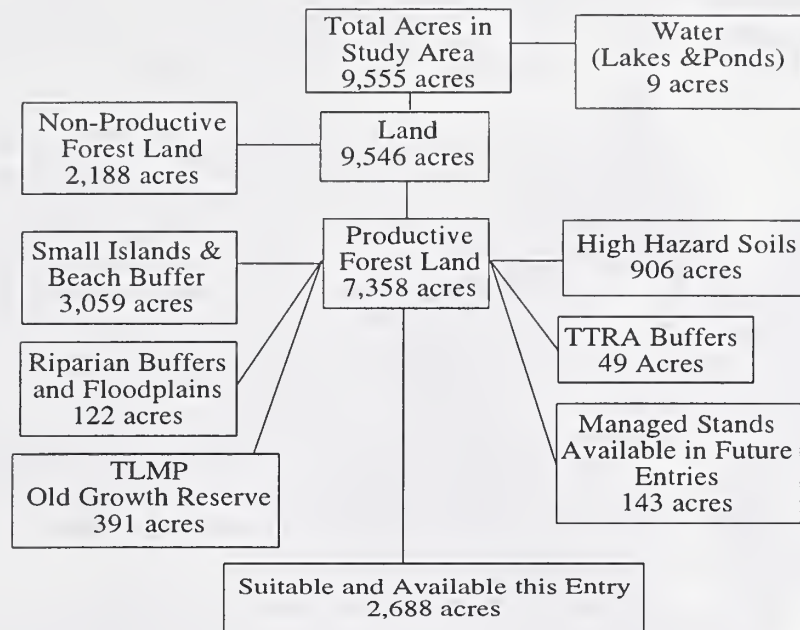
For the reasons described in the Affected Environment section, biologists involved with this project agree that the North reserve holds the highest wildlife values of the three reserve options. This recommendation was made after consultation with the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game. Appendix K in the Forest Plan outlines criteria that may be used for deciding to move a small Old-growth Reserve which includes incorporating goshawk nesting habitat and suspected murrelet nesting habitat -- two site-specific factors in designing the North Reserve. We have also documented important use areas in the North reserve for the Alexander Archipelago wolf. The North Reserve is a part of Alternatives 5 and 6.

Cumulative Effects

It is important to look at cumulative effects within the Deer Island project area to assess impacts on species with limited dispersal capabilities. Effects on biodiversity at the regional level are discussed within the Forest Plan (see Affected Environment). The old-growth reserve within the project area is designed to contribute to the Forest Plan conservation biology strategy (see Old-growth Reserve and corridor discussions). Additional old growth habitat will remain within beach, estuary and stream buffers and on lands unsuitable for timber harvest. At least 60% of the productive old growth in this VCU (Value Comparison Unit) will remain in an unharvested state in the future under the assumption that all the current suitable land will be harvested within the next 100 to 150 years (Table OG-5). Harvest prescriptions that leave residual trees within units will also contribute to the conservation biology strategy.

Table OG - 5
Forest Land Suitability in the Kuakan Project Area

Value Comparison Unit 525 Acreage Classification
TLMP OGR



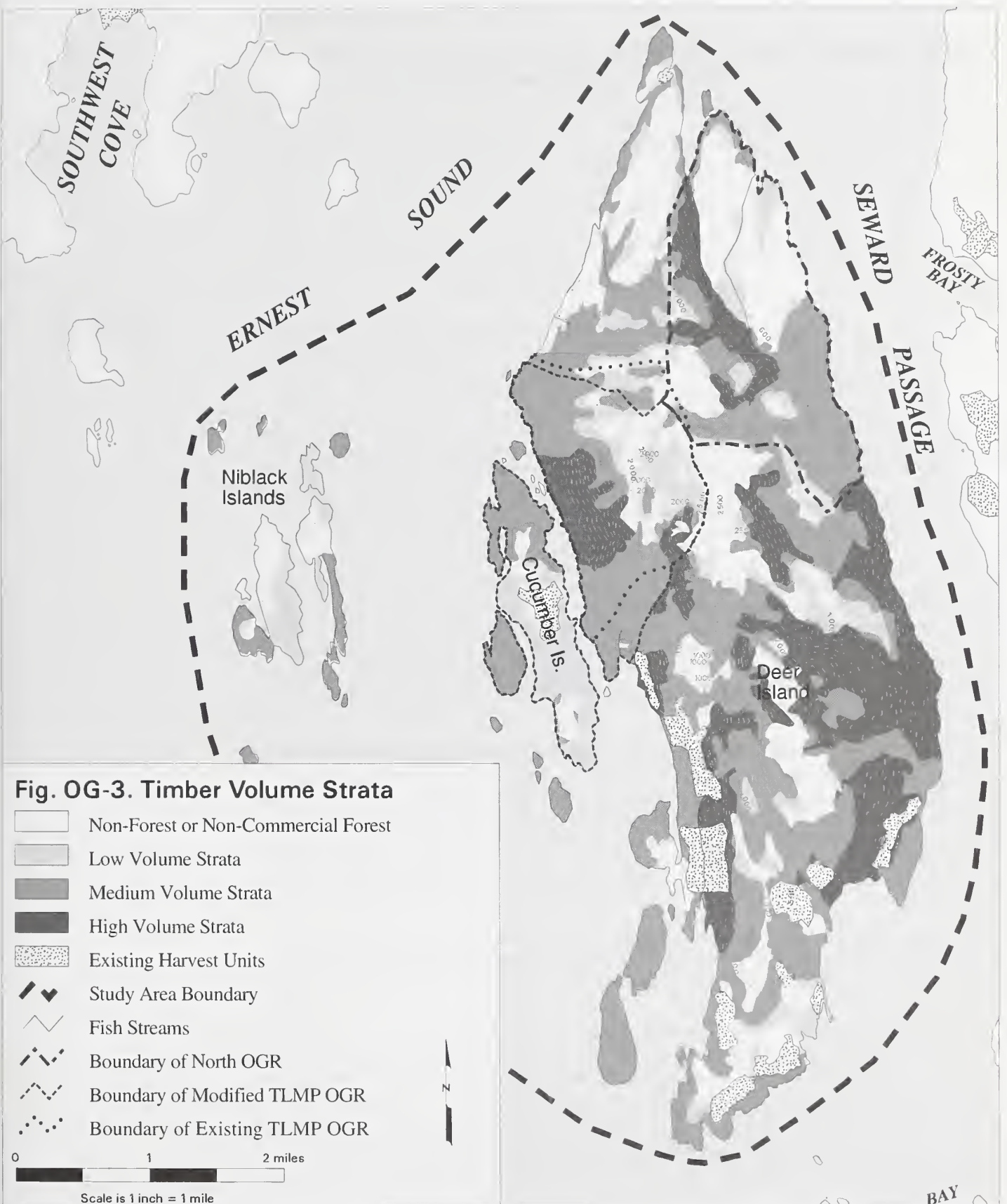
Alternatives for this project were initially designed under two different management scenarios based on the amount of harvest and the frequency of re-entry into the project area. Alternatives 2 and 4 fit within the heavier harvest/less frequent entry scenario, which would generally harvest a high percentage of the suitable acres, and then allow a long time to pass before returning to the project area to harvest again. Alternatives 3 and 6 fit within the lighter harvest/more frequent entry scenario, which would generally harvest a smaller percentage of the suitable acres, and re-enter the project area on a shorter time-frame for the next harvest. Alternative 5 falls between the harvest levels of the other alternatives, and differs from them by retaining more old-growth structure within harvest units this entry. Successive harvests using the strategy in Alternative 5 would re-enter the same units, removing more of the old-growth structure with a second and possibly a third entry into the same unit, maintaining an uneven-aged system. The areas not originally entered in Alternative 5 would likely be harvested under similar prescriptions as used in Alternative 5, but spaced in time to occur between the re-entries into the original Alt.5 units. This would lead to more frequent, lighter harvests on the suitable timber base over time, or to a longer rotation. The end result of all scenarios over time is that the suitable productive old growth would be converted to second-growth with variable amounts of residual legacy trees retained. Unit prescriptions would result in a variety of even-aged, two-aged and uneven-aged stands developing. Alternative 5 emphasizes uneven-aged management. Alternative 4 emphasizes two-aged management, with a small amount of uneven-aged. Alternatives 2, 3 and 6 have a broader mix of management systems, with the majority of units in two-aged management (Table OG-6).

Table OG - 6
Acres and Percentage of Harvest by Management System

	Alt 1		Alt 2		Alt 3		Alt 4		Alt 5		Alt 6	
Alternative	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Even-aged	0	0%	121	17%	42	9%	0	0%	0	0%	107	22%
Two-aged	0	0%	551	80%	374	82%	672	98%	0	0%	340	72%
Uneven-aged	0	0%	17	3%	40	9%	17	2%	1345	100%	28	6%
TOTAL	0		689		456		689		1345		475	

All alternatives meet Forest Plan connectivity standards and guidelines. Additional protection is provided by selection of prescriptions that mimic natural disturbance regimes or retain structure within units. Uneven-aged or two-aged management in the matrix may be the best option for retaining island biodiversity due to limited dispersal opportunities and small mammal concerns. Dispersal on the island is a concern with this project due to the small size of the island and small mammal issues. By managing a large area with a relatively light harvest, we leave the majority of forest structure in place this entry. The lighter harvest/more frequent scenario may benefit biodiversity and small mammals by initially affecting fewer acres than other alternatives. By managing fewer acres this entry or by leaving more structure within harvest units, more forested habitat is retained in an old-growth stage. The heavier harvest/less frequent scenario may have some benefits to long-lived species. An individual brown bear, for example, would only be disturbed once in its lifetime versus twice. However, due to limited dispersal opportunities on Deer Island and small mammal concerns, the lighter harvest/more frequent scenario and Alternative 5 that retains more structure within units rank higher for retaining biodiversity over time.

Alternatives 3 and 6 fall into the lighter harvest/more frequent entry scenario (Table OG-2). Alternative 3 proposes to construct a road that may have impacts on two wildlife species of concern, the Alexander Archipelago Wolf and the northern goshawk. Alternative 5 treats almost twice as many acres as the other alternatives but retains more old-growth structure through uneven-aged management (Table OG-4). Due to the relatively small size of Deer Island, Alternatives 5 and 6 appear to have advantages for maintaining island biodiversity, at least for this entry. Over time, some of this advantage may be attributable to the location of the small old-growth reserve on the north end, which is common to Alternatives 5 and 6, rather than to the intrinsic prescription approach for the harvest units.



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Fisheries, Watershed and Marine Resources

Deer Island is a relatively narrow island of about 13 square miles situated in Ernest Sound off the south end of Wrangell Island in Southeast Alaska. It is characterized by small, relatively steep watersheds that generally drain directly to marine waters without supporting fish populations. Deer Island itself is not considered an important producer of commercial, sport, or subsistence fish species. However, the marine waters surrounding Deer Island provide commercial fisheries for several species; most notably shrimp, crab, and salmon.

By law, we must maintain the existing uses of fresh and marine waters, protect riparian habitat, and prevent detrimental changes in water temperature, water chemistry, stream channel stability, and sediment loads that adversely affect these uses.

MARINE

Affected Environment - Marine Water

Seward Passage and Ernest Sound in the vicinity of Deer Island provide fishing grounds for salmon (seine, troll), halibut, shrimp (pots, beam trawl), crab (pots and rings), and commercial diving. There has been a herring fishery near the southwest side of Deer Island.

Site specific information about the submerged marine environment surrounding Deer Island is limited to investigations of proposed and existing Log Transfer Facility sites on the island. In 1997, the US Fish and Wildlife Service conducted a SCUBA dive survey of proposed LTF sites at the northeast end of the island (USF&WS unpublished LTF field investigation report, 1997). This area had robust beds of eelgrass as well as dense stands of kelp. Biological diversity was relatively high with many species of aquatic plants and invertebrates including crabs, anemones, and sea cucumbers in abundance.

A 1997 SCUBA dive survey of the existing West LTF discovered bark depth of 0 to 8 cm, with area coverage of two to five percent, well within the permit standards for LTFs (USFS unpublished bark monitoring survey, 1997). Small logs, sea cucumbers, shrimp, and other organisms were also reported along the dive transect. This LTF was developed in 1988 and processed 14.8 MMBF of timber, predominately as water drops towed into land for sorting, then rewatered for rafting. The Forest Service has applied for permit renewals for the West LTF.

Environmental Consequences - Marine Water

The accumulation of bark and other woody debris on the ocean floor associated with the transfer and storage of logs can impact marine habitats by smothering organisms or creating unfavorable chemical conditions. Tideland fills at LTFs can destroy marine habitats and displace organisms. Currently, these effects are not apparent at the existing LTF site. Concern for these impacts on the productive sites found in the vicinity of the proposed LTF, as well as potential conflicts with commercial fishing operations and gear, led us to carefully consider the options for log transfer activities.

All action alternatives for the Kuakan project consider reopening the West LTF. The timber sale purchaser would have the option of redeveloping this site alone or in combination with barges for landing and processing logs flown from helicopter units on the west side of Deer Island.

If Alternative 2 or 3 were selected, the timber sale purchaser would probably develop the new North LTF on the northeast side of the island. The new LTF could be used alone, or in combination with barges for landing and processing logs flown from helicopter units.

Appendix D describes site selection guidelines for the proposed LTF. In their report, the USF&WS recommends against development of any of the proposed new LTF sites. Of the six sites that the USF&WS dove, "North 2" was identified as having the least number of animals present and fewer sea cucumbers noted. Development at this location would affect

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fewer species than any of the other locations. In order to minimize the effects of the LTF on the marine habitat in this area, the LTF would be a rock ramp with minimal log bulkhead to facilitate barge loading. Logs would be loaded directly to a barge, and no log rafts would be constructed at the LTF. The rock ramp and bulkhead would be removed upon completion of the sale. Flushing potential is good, given the currents present through Seward Passage and out of the Bradfield Canal. Dispersion of sunken or floating wood debris should not be a concern, since logs would be loaded directly onto barges instead of being placed in the water and rafted.

Alternatives 4, 5 and 6 are helicopter alternatives and do not propose development of a new LTF. Harvest volume from these alternatives would be yarded directly to barges along the shoreline, with a small amount of volume possibly being yarded to the Deer Island West LTF.

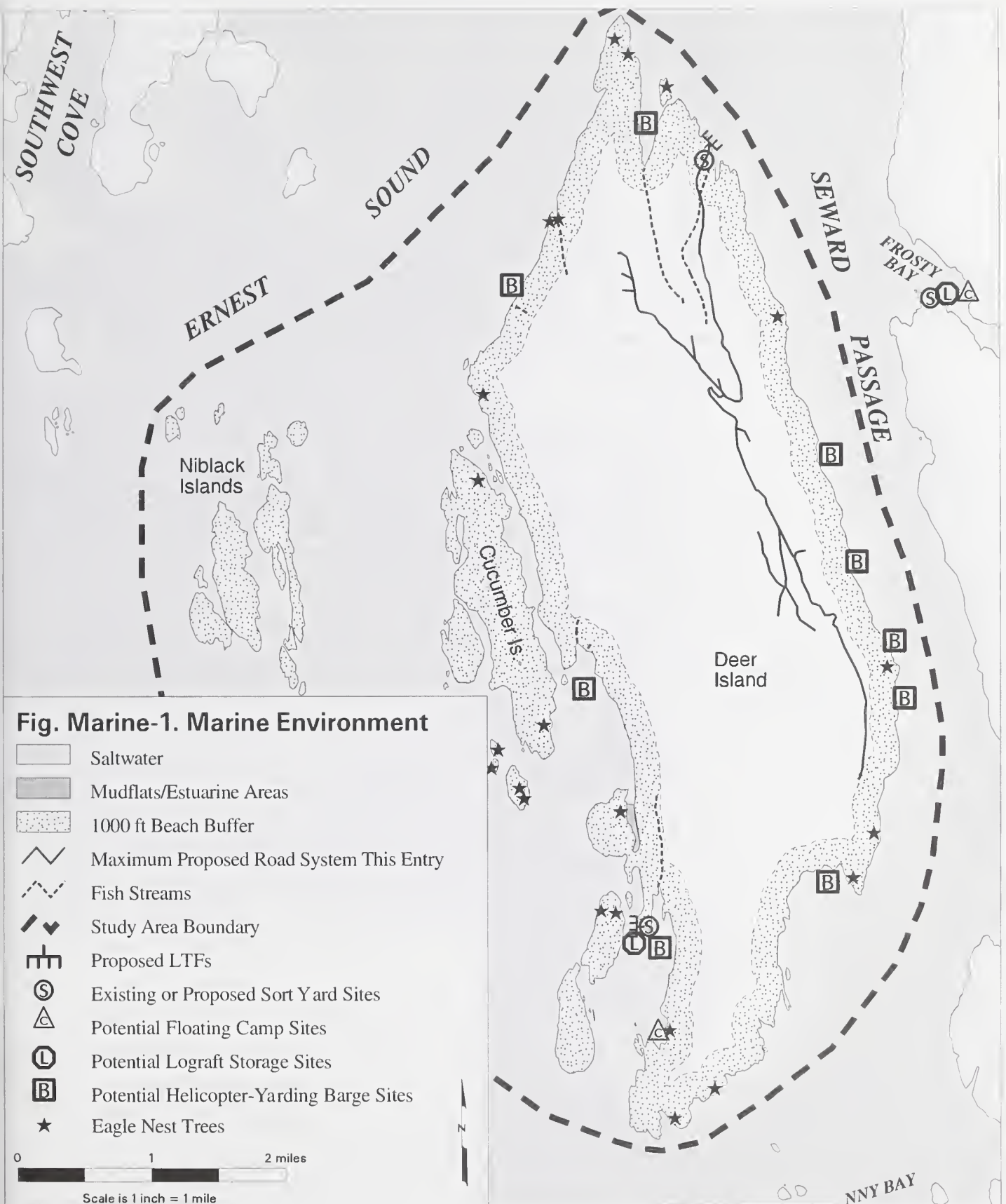
No helicopter-to-water drops would be allowed under any alternative. All action alternatives have potential to result in conflicts between timber sale operations and commercial fishing activities. For example, barges, log rafts, or floating camps could be located in areas which are preferred crab or shrimp pot sites. If these conflicts occur, we anticipate they will be temporary and similar to conflicts which typically occur between competing fishermen.

Figure Marine-1 shows potential log transfer sites, sort yards, temporary barge locations, log raft storage sites and possible floating camp locations. The timber sale operator will have the discretion to choose the actual sites for these activities, which will be subject to other agency permits. By disclosing our best estimates of these sites in advance, we hope to minimize the potential for conflicts between timber sale operations and commercial fishing activities. We have received no site specific comments regarding conflicts with the potential sites shown on Figure Marine-1.

Table Marine - 1 Comparison of Alternatives - Log Transfer Facilities

	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Use of old LTF allowed	yes	yes	yes	yes	yes
New LTF proposed	yes	yes	no	no	no

Table Marine-1 compares the alternatives' use of LTFs. In conclusion, Alternatives 2 and 3 will have the most direct effects on marine habitat due to the development of a new LTF. The new LTF will destroy some nearshore habitat through placement of fill. Some intertidal and marine organisms will eventually recolonize the fill area. All alternatives have potential to impact marine habitat during rafting and other activities at the existing LTF site. All alternatives will employ mitigation measures (including permit requirements) and monitoring to ensure marine impacts are minimized.



FISH

Affected Environment - Fresh Water Fisheries

Fisheries reconnaissance was initially conducted by Forest Service and Alaska Department of Fish and Game personnel on Deer Island by foot and helicopter in May of 1975. This survey relied solely on visual observations to verify fish presence. The only fish observed during this survey were "trout" fry in Canyon Creek at the northern end of the island. No streams (to this date) on Deer Island are listed in ADF&G's catalogue of waters important to anadromous fish. There are no official names for streams on Deer Island; we assigned local names for easy reference. Figure Water-1 on the next page shows the location of Deer Island streams.

In preparation for planning the Kuakan Timber Sale, Forest Service personnel conducted fisheries reconnaissance by foot in summer 1997 and 1998. This survey used visual observations, electrofishing, and minnow trapping. Typically, fish crews walked streams from the shoreline to the upstream limit of verified fish or beyond. In some cases, crews were dropped off by helicopter and walked downstream to the shore. The fisheries crew collected stream gradient, width, incision depth, and substrate data during their survey in order to classify streams by Tongass National Forest habitat management classes and physical process groups or channel types. The habitat management (or fish stream value) classes are defined as follows (Forest Plan page 4-8):

Class I: Streams and lakes with anadromous or adfluvial fish habitat;...or habitat above fish migration barriers known to be reasonable enhancement opportunities for anadromous fish.

Class II: Streams and lakes with resident fish populations and generally steep (6-15 percent) gradient (can also include streams from 0-6 percent gradient) where no anadromous fish occur, and otherwise not meeting Class I criteria. These populations have limited fisheries values and generally occur upstream of migration barriers or have other habitat features that preclude anadromous fish use.

Class III: Perennial and intermittent streams with no fish populations but which have sufficient flow, or transport sufficient sediment and debris, to have an immediate influence on downstream water quality or fish habitat capability. These streams generally have bankfull widths greater than 5 feet and are highly incised into the surrounding hillslope.

Class IV: Other intermittent, ephemeral, and small perennial channels with insufficient flow or sediment transport capabilities to have an immediate influence on downstream water quality or fish habitat capability. These streams generally are shallowly incised into the surrounding hillslope.

Non-streams: Rills and other watercourses, generally intermittent and less than 1 foot in bankfull width, little or no incision into the surrounding hillslope, and with little or no evidence of scour.

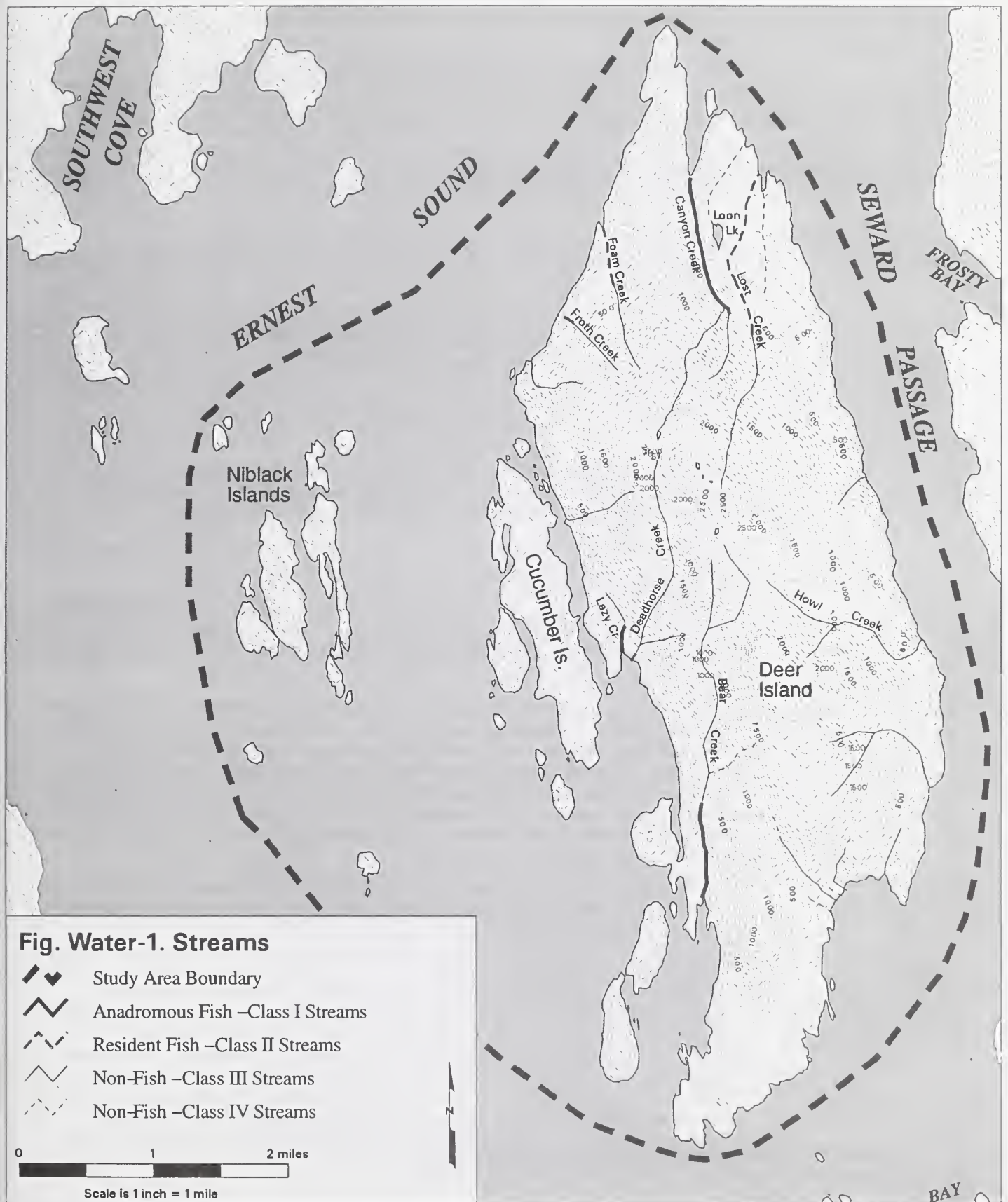


Table Fish-1 displays the findings of the 1997 and 1998 surveys.

Table Fish - 1 Fish species verified in streams on Deer Island.

STREAM NAME	1975 ADF&G/FS Survey Identification	Class I stream length (mi)	Anadromous Fish Species Observed 1997 or 1998	Class II stream length (mi)	Resident Fish Species Observed 1997 or 1998
Canyon	SP-4	1.1	coho salmon	0	cutthroat trout Dolly Varden char
Bear		0.7	coho salmon	0	
Deadhorse	ES-2	0		0.1	Dolly Varden char
Foam	ES-1	0		0.4	cutthroat trout
Lost		0		1.3	cutthroat trout
Lazy		0.2	coho salmon	0	Dolly Varden char
Froth		0		0.1	not surveyed
Totals		2.0		1.9	

The wildlife crew observed loons and fish rising on Loon Lake, but the fisheries crew was unsuccessful in trapping fish there. The outlet of Loon Lake (a small Class IV stream with at least one six foot high waterfall) was electroshocked with no fish observed.

Spawning and rearing habitat in streams across Deer Island is poor due to the small size of the watersheds, steep stream gradients, large stream substrate, and lack of deep pools. There are no reasonable fish habitat enhancement opportunities. Very few coho salmon were found in any of the three Class I reaches. The upper limit of Class I reaches shown on Fig. Water-1, Streams, correspond to the first physical barrier (water fall) beyond which no fish at all were observed, generally far upstream from the last coho salmon observation. Therefore, the Class I stream lengths shown in Table Fish-1 can be considered generous.

The greatest concentration of fish streams is found at the north end of Deer Island (Canyon and Lost Creeks). The upstream end of the Class I reach of Canyon Creek and the lower reach of Lazy Creek represent the best quality riparian habitat on Deer Island: these are small, low or moderate gradient meandering streams with floodplain features (debris jams, gravel bars, short side-channels, large spruce trees). The lower reach of Bear Creek may have been good quality riparian habitat but was clearcut in 1989. This stream has characteristics similar to Canyon and Lazy Creek but has accumulated large amounts of logging slash and no longer has a mature riparian forest.

The stream process group and channel type classification (USDA Forest Service, 1992) reflects physical differences in stream channels and processes and provides the basis for delineating riparian management areas or no-harvest buffers required by the Forest Plan. The most important and sensitive process groups (floodplain, estuarine, and palustrine streams) are not found on Deer Island. Throughout the Tongass National Forest these low gradient streams generally contain the highest quality fish habitat and are the most sensitive to sediment deposition. Deer Island streams include short reaches of moderate gradient mixed control (MM), alluvial fan (AF), and moderate gradient contained (MC) streams. These streams are slightly steeper and alternately receive and transport sediment. The moderate gradient mixed control reaches provide the most productive fish habitat on the island. By far, most Deer Island streams fall into the high gradient contained (HC) process group. These streams are generally headwater streams with limited fish habitat (Class II if any) and function as conduits of sediment and debris to downstream reaches, or in the case of many Deer Island watersheds, directly to marine waters.

In summary, anadromous and resident fish productivity is very low in Deer Island streams. There are less than four miles of fish bearing streams on the entire island. The most important fish-bearing streams (and riparian areas) on the island are Canyon, Lost, Lazy, and Bear Creeks.

Environmental Consequences - Fresh Water Fisheries

The risks of short and long term impacts to fisheries associated with timber harvest and road construction are relatively low on Deer Island when compared to timber sales planned in watersheds with more productive fisheries. Alternatives which construct road across fish streams will have a short term, direct impact on fisheries.

Table Fish-2 displays the amount of road construction by alternative. Only Alternatives 2 and 3 would have direct impact to fisheries since both of these alternatives construct road across Lost Creek (a Class II stream) and tributaries to Canyon and Lost Creeks.

Table Fish - 2 Comparison of Alternatives - Roads and Streams.

Alternative		Canyon	Lost	Other	Non-Watershed	Total
2	Road Miles	1.0	1.8	2.1	4.5	9.4
	Total Stream Crossings	2	2	4	0	8
	Class II Stream Crossings	0	1	0	0	1
3	Road Miles	1.0	1.7	0.2	1.3	4.2
	Total Stream Crossings	2	2	0	0	4
	Class II Stream Crossings	0	1	0	0	1

There is only one fish stream crossing in any alternative. The crossing site and applicable mitigation measures are described in the road card (Appendix B). None of the other alternatives would have direct impacts on fisheries since they do not construct road across fish streams. Best Management Practices (BMPs) will be applied to road construction and timber harvest with all alternatives to ensure the protection of water quality and fisheries. BMPs are described in the Alaska Region Soil and Water Conservation Handbook (USDA Forest Service, 1996. Forest Service Handbook 2509.22). Implementation of no-harvest riparian management areas will ensure the protection of stream courses and riparian habitat. For example, the buffer adjacent to the Class I reach of Canyon Creek will vary (according to the stream process group) from a minimum of 100 feet (horizontal distance) or 130 feet (slope distance) and could be substantially wider based on the sideslope distance adjacent to the stream. Buffers will not be modified and will be implemented as described in the Forest Plan.

Recreational Fisheries

Executive Order 12962 directs Federal Agencies to conserve, restore and enhance aquatic systems to provide for increased recreational fishing opportunities. Currently, recreational fishing occurs at saltwater all around Deer Island. We have no indications that people fish any of the streams on Deer Island. Alternatives 2 and 3 propose road construction that could improve hike-in access to a small class II (resident fish) stream. It is highly unlikely that this stream (Lost Creek) would develop into a recreational fishery stream due to the small size of the stream. Recreational fishing opportunities will remain essentially the same because aquatic habitats are protected through implementation of BMPs and riparian buffers.

Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act of 1996 requires consultation with the National Marine Fisheries Service on activities which may effect

Essential Fish Habitat, defined as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity." The Act promotes the protection of these habitats through review, assessment, and mitigation of activities which may adversely affect these habitats. This EIS satisfies the consultation requirements by providing a description and assessment of Essential Fish Habitat in the project area, a description of the Kuakan project and its potential impacts on these habitats, and a description of the mitigation measures that will be implemented to protect these habitats.

Essential Fish Habitat includes all freshwater streams accessible to anadromous fish, marine waters, and intertidal habitats. For the Kuakan project this would include all Class I streams, and the marine waters and intertidal habitats at the project area shoreline.

The Kuakan project is unlikely to adversely affect Essential Fish Habitat for the following reasons: 1) there are very few Class I streams on Deer Island, 2) proposed new roads cross no Class I streams; 3) all harvest units adjacent to Class I streams employ no-harvest buffers at least 100 feet wide and generally wider according to Forest Plan standards and guidelines. The Best Management Practices described in unit and road cards (Appendices A and B) provide assurance of water quality and aquatic habitat protection for all freshwater streams and marine waters affected by the project.

Affected Environment - Watersheds

WATERSHEDS

About half of Deer Island consists of small watersheds draining into first and second order streams. The other half consists of land areas which do not contribute to island streams. Hydrologic processes within these "non-watershed" areas may create wetland complexes and drainage features in relatively flat topography that are apparently isolated from mapped streams. Steeper areas may drain directly to marine waters via streams that are too small to reasonably map. Table Water-1 displays watershed data for all of the Deer Island watersheds.

Table Water - 1 Deer Island Watersheds

NAME	GIS Watershed Code	Watershed size (ac)	Watershed size (sq mi)	Class III stream length (mi)	Fish-Bearing	Percent of Watershed Area in Second Growth
Canyon	R27A	436	0.68	1.67	yes	0
Howl	R28A	349	0.55	1.8	no	0
	R29A	358	0.56	1.61	no	0
	R30A	302	0.47	0.96	no	9
Bear	R31A	987	1.54	2.73	yes	11
Deadhorse	R32A	348	0.54	1.88	yes	1
Foam	R33A	287	0.45	0.66	yes	0
Lost	RF7A	394	0.61	1.21	yes	0
	RF9A	283	0.44	0.29	no	0
	RG1A	90	0.14	0.36	no	28
Lazy	RG1Z	136	0.21	0.25	yes	4
	RG3A	52	0.08	0.58	no	0
	RG4A	56	0.09	0.56	no	0
Froth	RG5A	82	0.13	0.48	unknown	0
	total	8312	12.99	15.0	not applicable	not applicable

Only one watershed (Bear Creek) is larger than one square mile. The small size of Deer Island watersheds limits the application of some analytical tools that we usually use to characterize watershed conditions and processes. Nevertheless, using soils and stream information from our Geographical Information System (GIS) we can say the following about Deer Island watersheds:

- The steep nature of most of the watersheds, in combination with relatively steep and dense stream networks result in rapid and efficient transport of sediment downstream with little opportunity for long term sediment storage within the stream network.
- The greatest concentration of steep terrain and soils with high landslide potential occurs on the west side of the island in the vicinity of Bear, Deadhorse and Lazy Creeks. Much of this steep or unstable terrain lies outside watersheds and is directly tributary to marine waters.
- Wetlands in the headwaters of Bear, Canyon, and Lost Creeks are probably important sources of streamflow (especially during dry periods) and help sustain the resident fisheries in these small watersheds.
- Loon Lake is the only suspected fish bearing lake and the largest lake on the island. It lies on a divide between Lost Creek and Canyon Creek but drains directly to marine waters between these two creeks.
- Most of the fish-bearing watersheds are in pristine condition, with the exception of Bear and Lazy Creeks, which contain some second-growth from previous timber harvest (Table Water-1). There are currently no roads on Deer Island.

The fisheries crew focused on mapping and classifying known or suspected fish bearing streams, and areas downstream of proposed harvest units or roads. Therefore, some portions of the island were not surveyed as thoroughly as others. The Class I and II stream lengths shown in Table Fish-1 are fairly accurate. The Class III stream lengths shown in Table Water-1 may not be accurate for all watersheds. In some areas, Class III and IV stream mapping will be further refined during unit layout to ensure that riparian management areas are correctly identified and protected. We expect to find more Class IV streams during unit layout and have found that it is more efficient to map them at this time, rather than devote the amount of time and personnel required to map all Class IV streams in a project area prior to unit layout. Based on the definition of Class IV streams (above), their presence on Deer Island will not influence our analysis or comparison of alternatives. Individual unit cards (Appendix A) contain more detail on this issue.

Environmental Consequences - Watersheds

We can compare alternatives by calculating the amount of harvest and road construction within watersheds in each alternative. We emphasize fish-bearing watersheds in this assessment. Alternatives which construct the most road and stream crossings would have the most direct, short term impacts to water quality and fisheries. Therefore, Alternative 2 would have the most direct effects on water quality and fisheries, followed by Alternative 3, as shown in Table Fish-2.

Two assumptions underlie our comparison of impacts associated with harvesting in each alternative:

- Helicopter harvest systems result in less ground disturbance than cable harvest systems. Therefore, helicopter harvest results in less erosion and sedimentation, and fewer environmental consequences than cable harvest.
- When implemented by helicopter yarding, harvest prescriptions of individual or group selection, or small patch cuts which retain a high percentage (at least 65%) of trees result in less ground disturbance, and less disruption of hydrologic processes (interception,

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infiltration, etc.) than clearcutting or overstory removal which harvest a high percentage of trees in a stand. Therefore, high retention harvest prescriptions in these alternatives result in less erosion and sedimentation, less risk of changes in streamflow regimes, and fewer environmental consequences than low retention harvest prescriptions.

Table Water-2 displays a comparison of cable and helicopter harvest in fish-bearing watersheds by alternative. Note that the numbers in both Table Water-2 and Table Water-3 are based on proposed treatment acres (total harvest unit area) not harvest acres (actual acres harvested). The numbers here, therefore, represent a conservative approach to assessing watershed impacts by assuming that all treatment acres are harvested, without directly accounting for retention acres within harvest units. The numbers presented here will not match tables elsewhere in this document which are based on harvest acres.

Table Water - 2 Comparison of Alternatives - Harvest Systems by Watershed

Alt.	Harvest System	Canyon Creek (acres)	Bear Creek (acres)	Lost Creek (acres)	Lazy Creek (acres)	Total in Fish-Bearing (acres)	Total for Deer Island (acres)
2	Cable	26	0	34	0	60	396
	Helicopter	65	52	0	0	117	389
	Watershed Total	91	52	34	0	177	785
3	Cable	26	0	34	0	60	137
	Helicopter	65	52	0	0	117	505
	Watershed Total	91	52	34	0	177	642
4	Cable	0	0	0	0	0	0
	Helicopter	93	52	33	0	178	738
	Watershed Total	93	52	33	0	178	738
5	Cable	0	0	0	0	0	0
	Helicopter	0	160	0	14	174	1345
	Watershed Total	0	160	0	14	174	1345
6	Cable	0	0	0	0	0	0
	Helicopter	0	99	0	10	109	692
	Watershed Total	0	99	0	10	109	692

Alternatives 2, 3, 4, and 5 propose similar amounts of harvest in fish-bearing watersheds. However, Alternatives 4 and 5 would have less impacts than Alternatives 2 and 3 due to their reliance on helicopter yarding instead of cable yarding. Alternative 6 would have the least impacts of all the alternatives using this criteria since it harvests the least acres in fish-bearing watersheds. Note that all alternatives propose more helicopter harvest than cable harvest in fish-bearing watersheds. Table Water-3 displays the harvest prescriptions in fish-bearing watersheds proposed in each action alternative.

Table Water - 3 Harvest Prescription Treatment Acres by Watershed

Alt.	Harvest Prescription	Canyon Creek	Bear Creek	Lost Creek	Lazy Creek	Total in Fish-Bearing	Total
2	Clearcuts & Overstory Removal	26	52	34	0	112	680
	Individual or Group Selection & Patch Cuts	65	0	0	0	65	105
3	Clearcuts & Overstory Removal	26	52	34	0	112	406
	Individual or Group Selection & Patch Cuts	65	0	0	0	65	236
4	Clearcuts & Overstory Removal	28	52	33	0	113	672
	Individual or Group Selection & Patch Cuts	65	0	0	0	65	66
5	Clearcuts & Overstory Removal	0	0	0	0	0	0
	Individual or Group Selection & Patch Cuts	0	160	0	14	174	1345
6	Clearcuts & Overstory Removal	0	99	0	0	99	374
	Individual or Group Selection & Patch Cuts	0	0	0	10	10	316

Alternatives 2, 3, 4, and 6 would have greater impacts than Alternative 5 due to their use of "heavier" harvest prescriptions in fish-bearing watersheds. Although Alternative 5 results in the most acres harvested in fish-bearing watersheds and on Deer Island, it uses a "lighter" harvest exclusively, which may result in less watershed impacts overall.

Table Water-4 displays the effects of alternatives on road density and cumulative harvest in fish-bearing watersheds. These indices are commonly used to evaluate watershed management thresholds or triggers for more intensive watershed analyses (Forest Plan Appendix J). They are commonly calculated only for watersheds over 5000 acres, and because they are sensitive to watershed size, they appear high when compared to the same indexes calculated for larger watersheds. Road densities for Alternatives 4, 5, and 6 would be 0 mi/sq mi since these alternatives do not construct roads. Only clearcut and overstory removal prescriptions were included in calculating cumulative harvest levels, following the assumptions described above.

Table Water - 4 Road Density and Second Growth by Watershed

Watershed	Watershed Road Density (mi/sq mi)		Percent of Watershed in Second Growth*				
	Alt 2	Alt 3	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Canyon	1.5	1.5	6%	6%	6%	0%	0%
Bear	0	0	16%	16%	16%	11%	21%
Lost	3.0	2.8	9%	9%	8%	0%	0%
Lazy	0	0	4%	4%	4%	4%	4%

*clearcut and overstory removal harvest prescriptions only

Table Water-4 shows that Alternative 6 results in a higher proportion of Bear Creek watershed in second growth.

Summary

In summary, all alternatives incorporate design features that minimize risks to watersheds and fisheries. Very few permanent stream crossings, and only one fish stream crossing, are planned in any alternative. All alternatives incorporate helicopter harvest systems and high retention harvest prescriptions. Beyond these important, broad scale design features, site-specific application of BMPs such as stream buffers and stream protection during harvest will minimize erosion and sedimentation. All mitigation measures equal or exceed the Alaska Forest Resources and Practices Regulations (11 AAC 95, 1993). Alternative 2 would have the most impacts on watershed and fisheries due to its construction of the most road and use of cable and clearcut harvest. Alternative 3 follows; it is very similar to Alternative 2, but constructs less road. Differences between Alternatives 4, 5, and 6 are much more subtle. Of these three, Alternative 5 may result in less cumulative effects to Bear Creek since it does not substantially increase the proportion of second growth in that watershed. None of the alternatives are expected to have significant impacts on watersheds or fisheries.

Improvement Projects

Bear Creek riparian area may benefit from slash removal and a thinning prescription to hasten the return of large stream-side trees.

Implementation and Effectiveness Monitoring

LTF monitoring (described in Appendix D) is a permit requirement.

BMP implementation will be monitored according to the Tongass National Forest protocols. One hundred percent of the units and roads will be inspected by the sale administrator and road inspector. An annual random sampling of all Wrangell Ranger District units and roads monitored by fisheries or watershed specialists may include Kuakan timber sale units or roads.

Due to the relatively low fisheries values on Deer Island and the relatively low occurrence of roads and units adjacent to freshwater fisheries, we do not expect this project to lend itself to effectiveness monitoring of BMPs or fisheries issues described in the Forest Plan. However, riparian no-harvest buffers and fish stream culverts on Deer Island may be included in annual Tongass-wide assessments of buffer stability (aerial reconnaissance techniques) or fish passage (road condition surveys).

Heritage Resources

Heritage resources represent past human activities that span the last several thousand years. While present, heritage resources in the project area are limited in size, complexity and age. This suggests the project area has not witnessed concentrated human habitation such as that represented in nearby areas by ancient village sites, camps and other settlements.

Affected Environment

We conducted an extensive archival and literature search of references to heritage resources in the project area. Our search revealed very little specific information about the project area. The project area is within the former territory of the Stikine Tlingit. Ethnographic records suggest Deer Island was used primarily for subsistence harvest and that the Stikine Tlingit decided not to live on the island so they would not scare off the wild game (Goldschmidt and Haas 1998:76). In August 1793 George Vancouver's survey party sailed by Deer Island, but they did not encounter Alaskan Native people until they reached Bradfield Canal, north of the project area (Vancouver 1984:398). Vancouver named Ernest Sound for Prince Ernest, one of the sons of King George III (Wagner 1937:486).

Origination of Place Names

Lieutenant Commander A.S. Snow (U.S. Navy) named Seward Passage in 1886, no doubt for William Henry Seward (U.S. Secretary of State 1861-1869) who negotiated the purchase of Alaska. Snow named Deer Island in 1886 and in 1887 the U.S. Coast and Geodetic Survey (USC&GS) published the name on USC&GS Chart 706 (Orth 1967:264). Snow named the Niblack Islands for Ensign Albert Parker Niblack, a member of his U.S. Navy survey party (Orth 1967:686). Niblack later wrote *The Coast Indians of Southern Alaska and Northern British Columbia* (Niblack 1970), a book on the material culture of the northern Northwest Coast Indians. In 1904 H.C. Fassett (U.S. Bureau of Fisheries) reported that local fishermen named Point Peters at the southern tip of Deer Island (Orth 1967:751). Kuakan Point, on the northern tip of Deer Island, was assigned in 1923 by the USC&GS from "qowakan," the Tlingit name for deer (Orth 1967:547).

Historic Sites

We checked the Alaska Heritage Resource Survey, a statewide listing of heritage resources, and discovered that there are no sites listed for the project area. Sealaska Corporation commissioned a study of historic and cemetery sites throughout southeast Alaska in 1975, but they did not list any sites within the project area (Sealaska Corporation 1975).

Our archival and files search reveals that there are several historic sites within the project area which have not been formally documented. The Stikine Area heritage resource atlas lists a trapper's cabin occupied in 1916 at the southern end of Deer Island. The atlas includes a special use permit issued to Grover Cleary in 1919 for a fur farm on the Niblack Islands. Cleary transferred the permit to Victor Lindgren in 1920 and the Niblack Island Fox Company held the permit from 1922 to 1927. Carlson and Tollefsen held the permit from 1929 to 1944, but there is no record of a permit holder between 1944 and 1952. Forest Service records list a residence permit on the Niblack Islands issued to Albert Carlson from 1952 to 1960. Wrangell resident Mickey Prescott reports a cabin on an island immediately west of Deer Island that was abandoned in the 1960s. None of these sites will be affected by the proposed timber sale.

Environmental Consequences

Previous heritage resource investigations in the project area have been limited in scope. In 1975 and 1976 Gerald Clark conducted reconnaissance surveys on the southern half of Deer Island. He found two stripped cedar trees, an axe-felled cedar tree and two small areas with notched cedar trees (Clark 1975 and 1976). Larry Roberts conducted a shoreline survey of Deer Island in 1984 and recorded culturally modified trees (CMTs) and several modern sites

No Sites Eligible for National Register of Historic Places

(less than 50 years old). The “modern” sites included a campsite, a trapline sign, two abandoned wooden fishing boats and a floathouse. The recorded CMTs included six axe-blazed cedar trees, one axe-blazed and stripped cedar tree, five stripped cedar trees, one plank removal cedar tree and a springboard-notched cedar tree. Most of these CMTs were scattered around the northern end of Deer Island.

In 1997 and 1998 the Stikine Area archaeologist surveyed portions of the project area. The Forest archaeologist designed a model to predict the probability of heritage resources for any portion of the project area. The model divides the project area into high and low probability zones. We defined the high probability zones as all areas between mean high tide and 100 feet elevation. The low probability zone includes all other lands in the project area. All of the possible timber harvest units and most of the roads are above elevations of 300 feet, placing them clearly within the low probability zone for heritage resources. The proposed log transfer facility and a small portion of the road leading to it are within the high probability zone for heritage resources and these areas received a complete heritage resource survey with subsurface testing.

Our archival search and an examination of the generally steep and rocky coast of Deer Island suggested the potential for heritage resources was very low. The field survey confirmed this assumption. We recorded CMTs along much of Deer Island’s coastline, with concentrations on the northern and southern tips of the island where the topography is less steep. Despite extensive subsurface testing we did not find any sites associated with the CMTs, such as camps or villages. None of the CMTs meet eligibility criteria for the National Register of Historic Places due to their dispersed nature and lack of associated cultural artifacts. We have therefore determined that there are no sites eligible to the National Register of Historic Places within areas of potential effect for the proposed timber sale.

Federal laws and regulations require processes for considering the impacts of Federal projects on significant heritage resources, i.e. sites eligible to the National Register of Historic Places. Major legislation related to these processes includes the National Historic Preservation Act, as amended; the Archaeological Resources Protection Act, as amended; the American Religious Freedom Act and the Native American Graves Protection and Repatriation Act. Section 106 of the National Historic Preservation Act (and the regulations in 36 CFR 800) outlines a process for evaluating the effects Federal projects may have on heritage resources. It involves inventorying heritage resources within a project area, determining which are significant or eligible to the National Register of Historic Places, evaluating project effects and designing and implementing measures to negate any adverse effect that project may have upon significant heritage resources. This process is undertaken in consultation with the Alaska State Historic Preservation Officer and sometimes the Advisory Council on Historic Preservation, an independent Federal agency.

We have consulted with the Wrangell Cooperative Association, the Federally recognized Indian tribe that is culturally affiliated with the project area, on the conclusions contained in this report.

We have completed an inventory of heritage resources in the project area and have determined that there are no sites eligible to the National Register within areas of potential effect. We submitted a report with our conclusions and recommendations to the Alaska State Historic Preservation Officer. The conclusions state that none of the cultural resources identified in the project area will be impacted by the proposed alternatives. Some undiscovered sites may exist in the project area. If a new site is discovered, it will be evaluated by a professional archaeologist. Mitigation plans will be initiated prior to any work that may adversely affect sites considered eligible to the National Register of Historic Places.

Recreation

The following discussions and analysis are based on the Scenic Quality and Recreation Resource Reports for the Kuakan Project Area. The Tongass' recreation and roadless area resources are discussed in considerable detail in the Forest Plan FEIS, Chapter 3. Applicable direction from the Forest Plan is contained in Chapter 3 (Modified Landscape Land Use Designation) and Chapter 4 (Forest-wide Standards and Guidelines). See also the Scenery section of this chapter.

Affected Environment

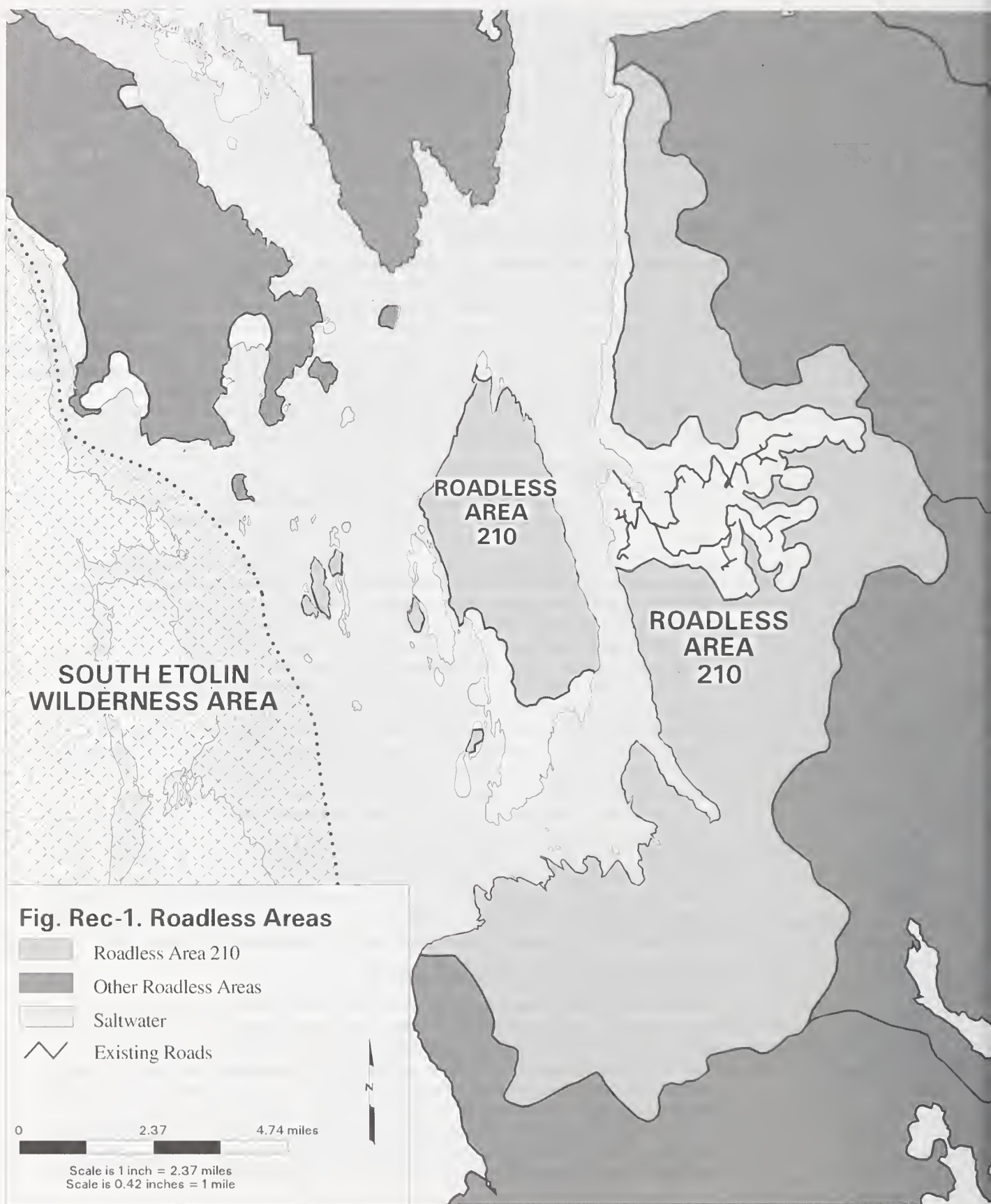
Recreation use of the Kuakan Project Area is relatively low. The most valuable recreation characteristic of the area is the scenery resource (discussed in detail in the Scenery Resource Report). The area is along Alaska's Inside Passage and is viewed by independent boaters and tourists travelling on ferries, cruise ships, and with outfitter/guides. Independent tourists cruising the Inside Passage may utilize some of the anchorages within the project area. Commercial and sport fisherman frequent the waters surrounding Deer Island. Land based activities likely to occur include hunting, camping, beachcombing, and exploring. The following discussion describes the existing condition of the area in terms of Inventoried Roadless Areas, Recreation Opportunity Spectrum (ROS), and Inventoried Recreation Places.

Frosty Inventoried Roadless Area (#210)

The Forest Plan identifies Roadless Area #210 (see Figure Rec- 1), which includes portions of the Kuakan Project Area, along with portions of the mainland. The Forest Plan makes no mention of Deer Island in the description it provides for the Frosty Roadless Area, yet the northern 2/3 of Deer Island is identified in the Roadless Inventory map (included with the Forest Plan map packet) as part of Roadless Area #210. An environmental impact statement for Deer Island was prepared in 1976 and stated that, at that time, the area would qualify for classification as Wilderness under the Wilderness Act. The EIS goes on to state that, although the area would qualify, "The resources and ecosystems present on Deer Island are not unusual to southeast Alaska. This area would not offer to the public natural features in a wilderness atmosphere which are not present in areas now under study for wilderness classification. Opportunities for adventure or challenge are limited to survival in adverse climatic conditions associated with the coastal rain forest." This portion of Roadless Area #210 has been assigned development LUD's (Modified Landscape and Timber Production in the current Plan) and has never been identified for designation as Wilderness. An area along the southern shore of Deer Island (where harvest occurred in 1989), and the small islands found to the west of Deer Island, are not included as part of Roadless Area #210. The area harvested for the Frosty Bay Timber Sale on the mainland is also excluded from Roadless Area #210. Vegetation is typical southeast Alaska temperate rain forest. Wildlife include black and brown bears, wolves, deer, and some goat on the mainland. Geese nest in Frosty Creek, and swans winter at Lake Helen in Santa Anna Inlet. Lake Helen is also a popular sport fishing site for resident trout. There are no public recreation facilities except the Frosty Bay Cabin (within the exclusion not inventoried as roadless), and public use is light.

Recreation Opportunity Spectrum

Recreation Opportunity Spectrum (ROS) is a system for inventorying recreation resources that categorize recreation opportunities into seven classes. Each class is defined in terms of the degree to which it satisfies certain recreation experience needs based on the extent to which the natural environment has been modified, types of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use. In timber planning projects, the most heavily weighted factors are the proposal of new roads, and proposed modification to the natural environment. The seven classes (from most natural to least natural) are: Primitive (P); Semi-Primitive Non-motorized (SPNM); Semi-Primitive Motorized (SPM); Roaded Natural (RN); Roaded Modified (RM); Rural (R); and Urban (U).



In the Kuakan Project Area, there are three ROS classes present. The inventoried ROS classes include Forest System lands and directly adjacent waterways in the acreage calculations, because effects on adjacent lands have a direct effect on the recreation experience of people using those waterways. (Including saltwater results in a higher total acreage than the acreage of the project area: 18,036 inventoried for ROS classes, existing acreage for the project area.) Of the 18,036 acres which are mapped for ROS classes, existing acreage for the ROS classes are: 1,993 acres of Semi-Primitive Non-motorized (11%); 9,347 acres of Semi-Primitive Motorized (52%); and 6,696 acres of Roaded Modified (37%). Although there are no roads on Deer Island, the inventoried Roaded Modified acres include past harvest units on the southern tip of Deer Island which are visible from water routes.

Recreation Places

There are four inventoried recreation places within the Kuakan Project Area (see Figure Rec-2): Deer Island - Southwest side (#22040.00); Deer Island - Northwest side (#22040.01); Deer Island - North (#22041.00); and the Niblack Islands (#22042.00). All recreation places are remote, with most recreation activities associated with them being water based. There are no developed recreation sites in these areas, although there is one special use permit for an isolated cabin in the Niblack Islands.

Deer Island - Southwest side (#22040.00)

Water based activities are the main recreation activities associated with the Deer Island - Southwest side recreation place. Land based activities include beachcombing, exploring, and access to hunting. The existing condition of the area is predominantly natural, although there are views of recent helicopter harvest on the southern portion of Deer Island and on the larger island directly west of Deer Island. This area provides a reliable anchorage for commercial fishing vessels, as well as independent tourists. There is an existing sortyard located in the largest Deer Island cove which consists of a flat, cleared area that may attract a small amount of land based activities. This sortyard is on the site of the Deer Island West LTF. This recreation place is currently inventoried as Roaded Modified in the ROS classification system. Recreation use of this area is low.

Deer Island - Northwest side (#22040.01)

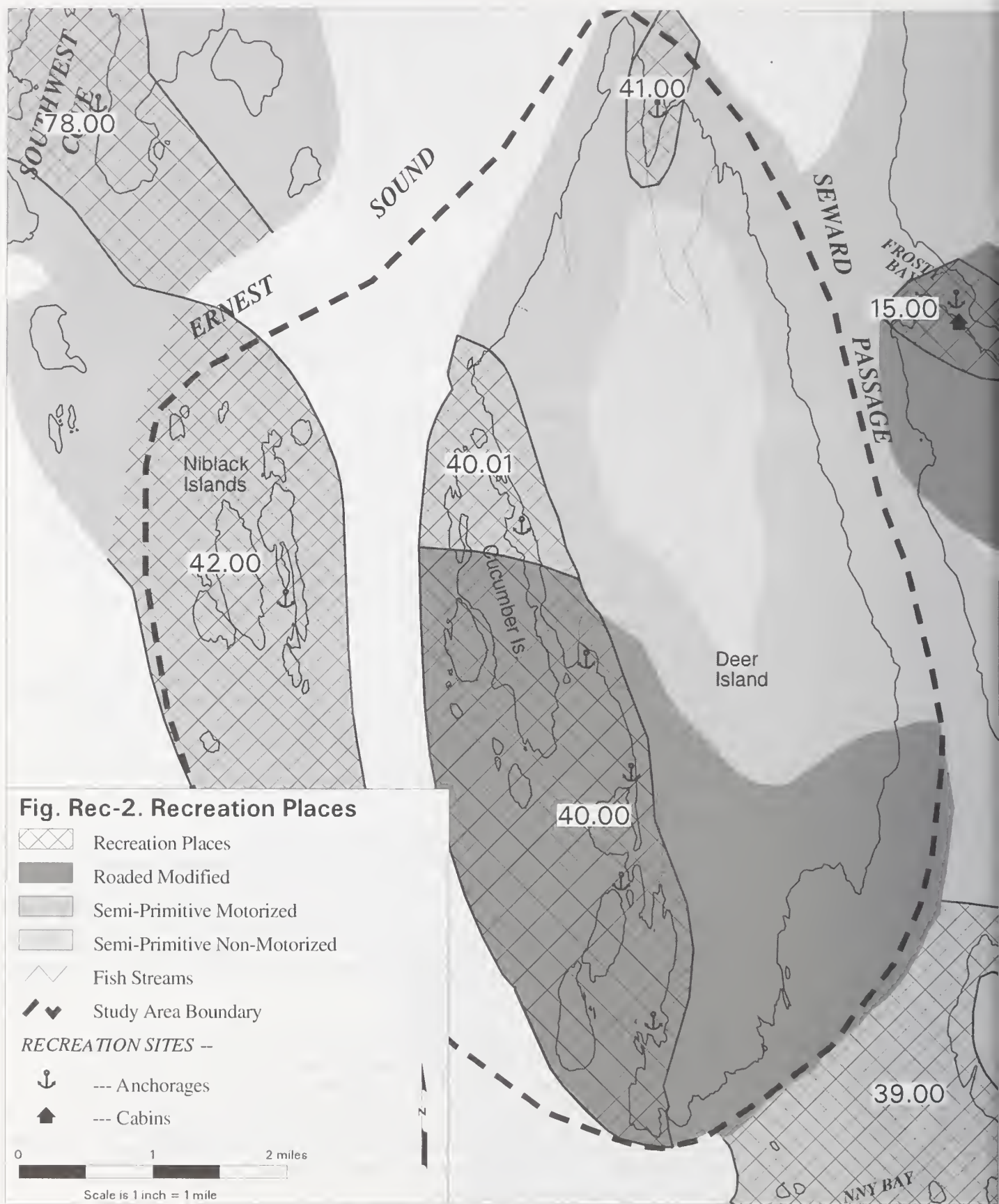
This Deer Island - Northwest side recreation place is directly north, and adjacent to, the Deer Island - Southwest side recreation place. Recreation activities in this area are predominantly water based, with some beachcombing/exploring activities likely on shore. People may use this area for access to hunting as well. The existing condition of this area is natural, with no visible harvest. This recreation place is currently inventoried as Semi-Primitive Motorized in the ROS classification system. Recreation use of this area is low.

Deer Island - North (#22041.00)

This Deer Island - North recreation place is located on the northern tip of Deer Island, including a small cove and island. Recreation activities are predominantly water-based. Land based activities may include beach combing, exploring, and access for hunting. The existing condition of the area is natural, with no view of harvest on Deer Island. This area likely provides some protection as an anchorage, though there are better areas for anchoring vessels close by (Frosty Bay being the closest). This recreation place is currently inventoried as Semi-Primitive Motorized in the ROS classification system. Recreation use of this area is low.

Niblack Islands (#22042.00)

This Niblack Islands recreation place includes a group of islands off the western shore of Deer Island. Recreation activities are predominantly water based, with the area providing some protection from open water. There is a special use cabin located on one of the islands, located on the same site as a former fox farm. This area may attract exploration of the uplands by boaters that happen upon it. The existing condition of the area is natural, with no visible harvest units. This recreation place is currently inventoried as Semi-Primitive Motorized in the ROS classification system. Recreation use of this area is low.



Environmental Consequences

Frosty Inventoried Roadless Area (#210)

Alternative 1 would result in no change to the character of the Frosty Roadless Area inventoried as area #210 in the Forest Plan. In all action alternatives, Roadless Area #210 would be reduced in size by 6,405 acres (those acres currently inventoried within Roadless Area #210 on Deer Island). Alternatives 4, 5, and 6 would result in varying levels of harvest, which would change the inherent character of Deer Island, but would retain the unroaded nature of the island. Alternative 3 proposes a short road (4.14 miles), and Alternative 2 proposes a longer road (9.36 miles).

Recreation Opportunity Spectrum

All action alternatives would result in a change to the character of the recreation setting during the life of the sale (see Table Recreation-2 and associated discussion). During logging activities, recreationists could be negatively affected by safety restrictions required for logging or the noise associated with logging. In some cases, logging activities may actually attract recreationists, particularly during helicopter yarding. The following discussion displays the changes expected to the ROS classes, once logging activities have ceased.

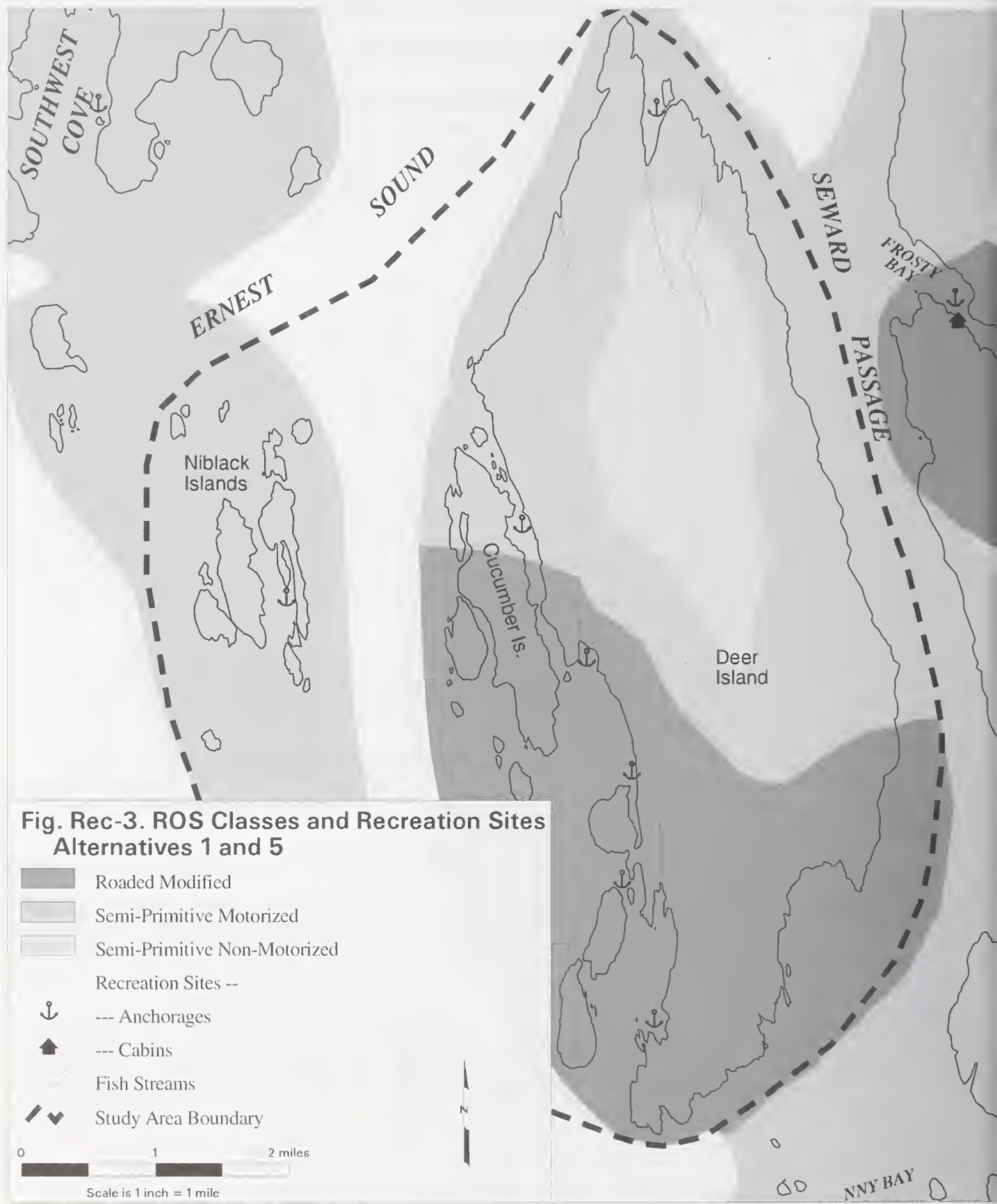
Alternatives 2, 3, 4, and 6 would result in a change to the existing ROS classes, mostly due to a combination of proposed roads and/or harvest units which would be visible from travel routes. Of the action alternatives that would change ROS classes, Alternative 6 would have the least impact, mainly because it proposes to move the Old Growth Habitat Reserve to the north end of the island, thus maintaining a SPM recreation experience in that area. Alternatives 2, 3, and 4 would have the same effect to ROS classes, even though Alternative 4 does not propose a road. The harvest units on the eastern side of Deer Island (along with the road proposed in Alternatives 2 and 3) would result in a RM recreation experience for most areas on Deer Island.

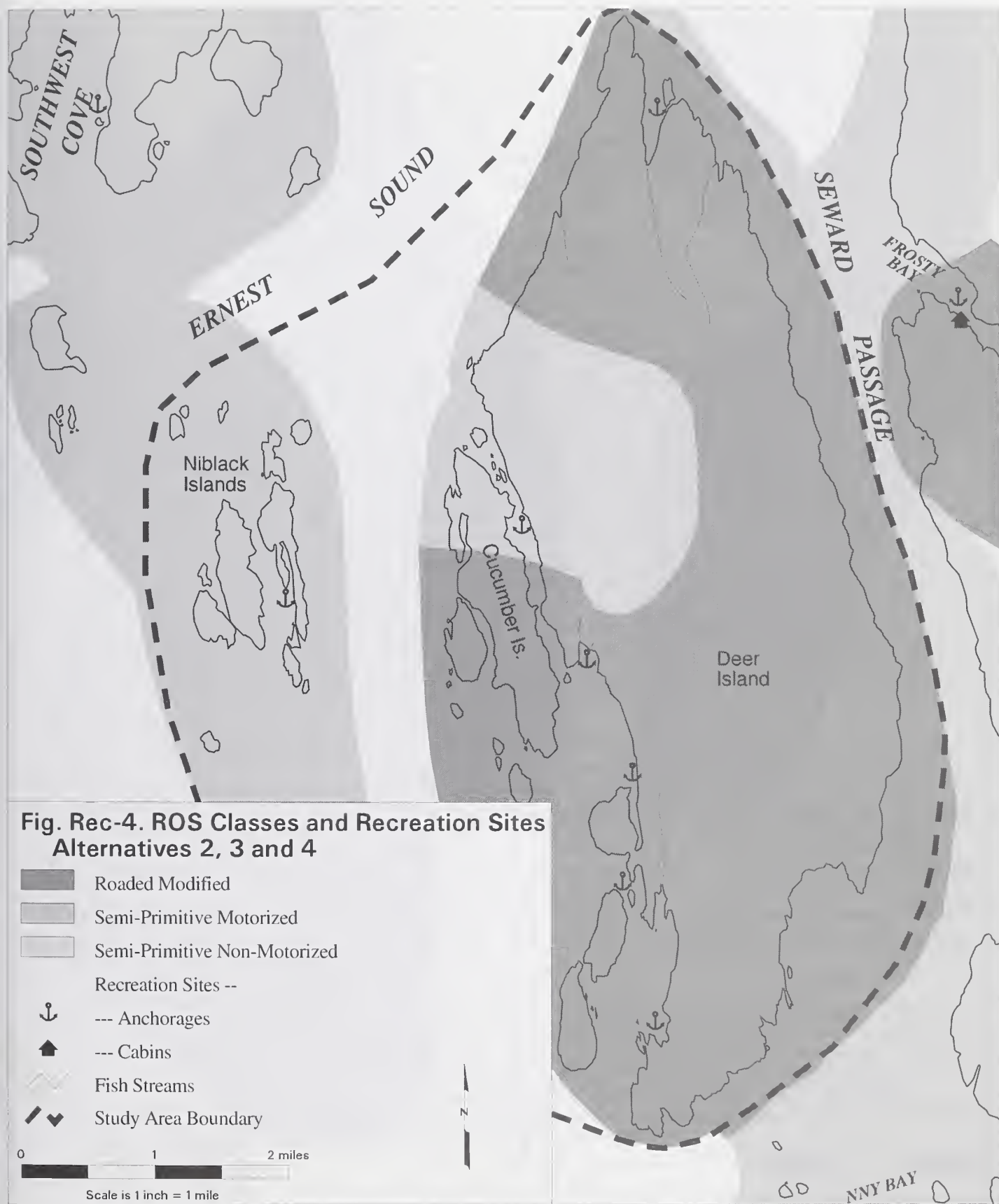
Alternative 5 would result in no change to the existing ROS classes, because there are no roads proposed in this alternative, and the harvest prescription would likely result in unnoticeable harvest. Alternative 1 would have no effect on the ROS classes. None of the alternatives would change the existing SPM class found in the Niblack Island group.

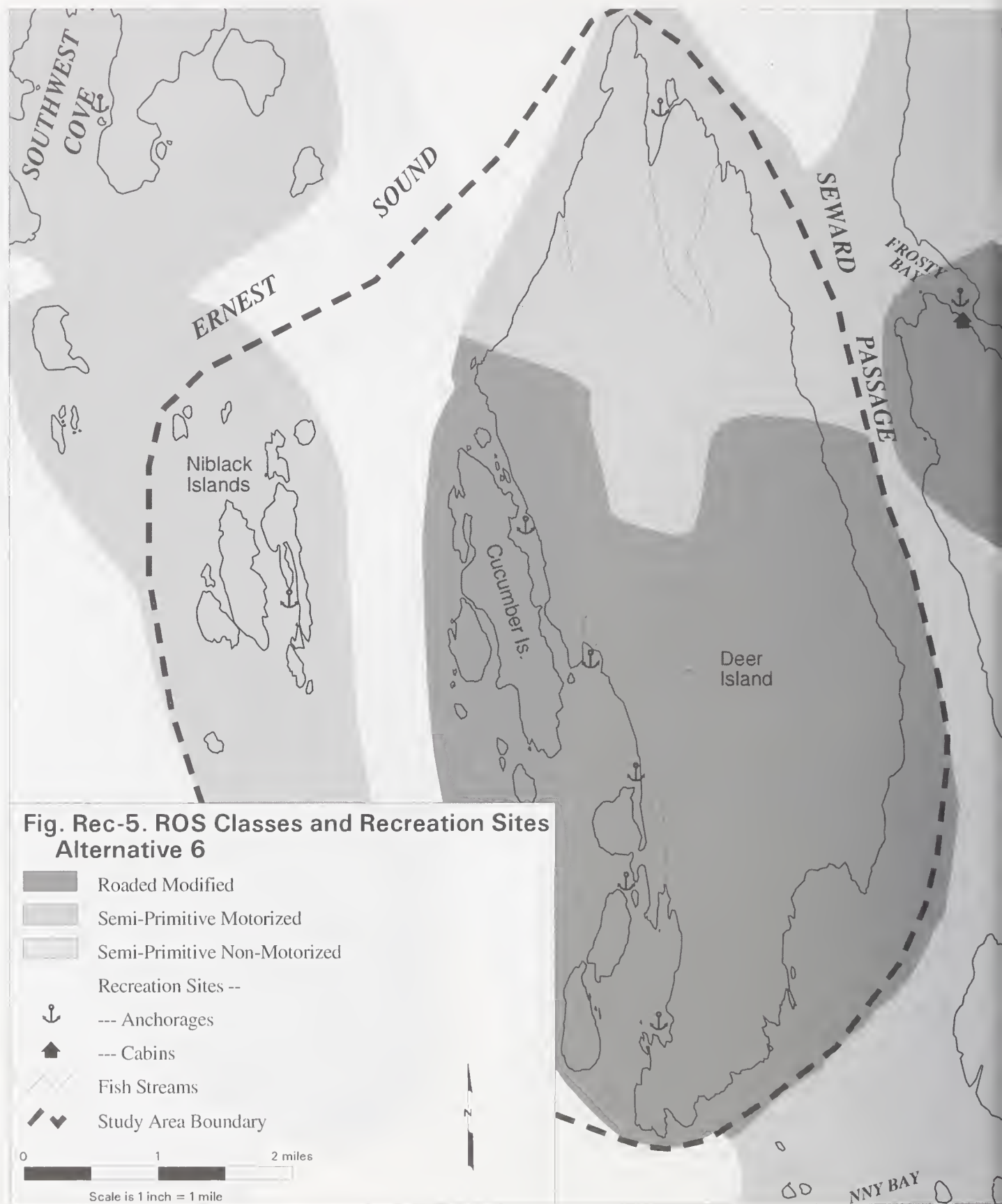
Figures Rec-3, Rec-4, and Rec-5 display changes to the ROS classes based on the different alternatives. The following table displays the number of acres of each ROS class resulting from implementation of the proposed alternatives. Percentages of the calculated acres of the whole project area are shown in parenthesis.

Table Recreation -1
ROS Acres by Alternative

ROS Class	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
SPNM	1,993 (11%)	0	0	0	1,993 (11%)	0
SPM	9,347 (52%)	5,458 (30%)	5,458 (30%)	5,458 (30%)	9,347 (52%)	7,242 (40%)
RM	6,696 (37%)	12,578 (70%)	12,578 (70%)	12,578 (70%)	6,696 (37%)	10,794 (60%)







Recreation Places

All action alternatives would have some effect to recreationists in and around the area, due to logging activities associated with the sale. Any action alternative selected would probably have a timber sale contract length of 5 years. The following table (Table Recreation-2) lists the types of activities expected with each alternative, and the number of seasons those activities could possibly occur if the operator was on-site for the entire contract time. Based on similar projects in the past (Campbell, Frosty Bay, Deer Island), we would anticipate an operator would actually complete the entire timber sale project in 1 to 2 years.

Table Recreation -2
Logging Activities Associated with Each Alternative

	North LTF Use	South LTF Use	Road Cons- truction	Cable Logging	Heli Logging	Tugs Rafts Barges	Crew Traffic	Barges (Yard to Water)
Alt. 2	Yes	Possibly	2 Seasons	5 Seasons	5 Seasons	5 Seasons	5 Seasons	1 Season
Alt. 3	Yes	Possibly	1 Season	5 Seasons	5 Seasons	5 Seasons	5 Seasons	2 Seasons
Alt. 4	No	Possibly	None	None	5 Seasons	5 Seasons	5 Seasons	5 Seasons
Alt. 5	No	Possibly	None	None	5 Seasons	5 Seasons	5 Seasons	5 Seasons
Alt. 6	No	Possibly	None	None	5 Seasons	5 Seasons	5 seasons	5 Seasons

Recreation places are inventoried sites where recreation use is assumed to be higher than surrounding areas. Recreation places are identified areas where people generally tend to congregate because there is some element of attraction in the area, such as developed facilities (trails, cabins, campgrounds), interesting natural features (sandy beaches, salmon streams), or (as in the case for the Kuakan recreation places) reliable anchorages for boaters.

Effects to the scenery surrounding recreation places are arguably the most important factor in changing the character of a given recreation place. In reading the Scenery section of this EIS, however, you may notice that the viewpoints chosen to display effects to scenery do not correspond with the recreation places listed below. This is because recreation places are generally found on land or very close to land, with limited views of the project area. Effects to scenery are better described from viewpoints along travel routes (roads or waterways). For a better understanding of expected changes to the scenery, please see the Scenery section of this document.

Deer Island - Southwest Side (#22040.00)

None of the action alternatives will result in significant, lasting changes to the Deer Island - Southwest recreation place. All action alternatives propose harvest of areas that may be visible from some waterways adjacent to this recreation place (see discussion of the South Ernest Viewpoint in the Scenery section of the EIS), but there is no harvest proposed within the inventoried recreation place. All action alternatives propose possibly re-opening the Deer Island West LTF found within this recreation place, which would result in direct effects to recreationists while logging activities are taking place (helicopter yarding, visible decked logs, etc.). ROS classification of this recreation place would not change under any alternatives (Roaded Modified). Once logging is complete, the recreation place will provide the same amenities it currently does.

Deer Island - Northwest Side (#22040.01)

All action alternatives propose harvest of areas that may be visible from waterways offshore of the area (see discussion of the North Ernest Viewpoint in the Scenery section of the EIS), but there is no harvest proposed within the inventoried recreation place. Alternatives 2, 3, and 4 would change the ROS setting from Semi-Primitive Motorized (SPM) to Roaded Modified (RM). Recreationists using the area during logging activities will be within sight/sound distance of helicopter yarding activities, but once logging is complete, the recreation place will provide the same basic amenities it currently does.

Deer Island - North (#22041.00)

Alternatives 2, 3, and 4 propose harvest that will be visible from the water directly adjacent to this recreation place (see discussion of the Frosty Viewpoint in the Scenery section of the EIS). Alternatives 1, 5, and 6 would not propose harvest visible from this recreation place. Alternative 1 (no action) does not propose harvest, and Alternatives 5 and 6 propose to move the Old Growth Habitat Reserve to the northern end of Deer Island. Alternatives 2 and 3 propose an LTF just south of this recreation place. Though the LTF would not be within the inventoried recreation place, its existence may attract additional use to the area, thus changing the character of this recreation place, and possibly shifting use from this cove to the LTF site. All action alternatives would result in logging activities which could disrupt recreationists during the life of the sale. Alternatives 2, 3, and 4 would change the ROS setting from Semi-Primitive Motorized (SPM) to Roaded Modified (RM).

Niblack Islands (#22042.00)

None of the action alternatives will result in lasting changes to the Niblack Islands recreation place. All action alternatives propose harvest that may be visible (at a distance) from waterways adjacent to the Niblack Island group (see discussion of the North and South Ernest Viewpoints in the Scenery section of the EIS). The existing ROS class (Semi-Primitive Motorized) would remain unchanged, regardless of which alternative is selected. With all action alternatives, recreationist may be disrupted by the sights and sounds of logging activities, but once the logging is complete, the Niblack Islands recreation place will provide the same amenities it currently does.

Scenery

The following discussions and analysis are based on and summarized from the Scenery and Recreation Resource Reports for the Kuakan Project Area. The scenic resources of the Tongass are also discussed in the Forest Plan FEIS, Chapter 3. Applicable direction may be found in the Forest Plan, Chapter 3 (Modified Landscape Land Use Designation), Chapter 4 (Forest-wide Standards and Guidelines), and Appendix F (Visual Priority Routes & Use Areas).

Affected Environment

The Kuakan Project Area includes Deer Island and the smaller islands found west of Deer Island. The area is located on Alaska's Inside Passage with Ernest Sound to the west of the project area, and Seward Passage to the east. The Kuakan Project Area is used by residents of Wrangell, Thoms Place, and Meyers Chuck for recreation; including hunting on the Forest System lands, and pleasure boating and fishing in the waters surrounding the islands. Tourist use of the area is relatively high in the summer months as they boat the Inside Passage. Although Ernest Sound is not one of the main routes used by the Alaska Marine Highway ferries and large cruise ships, it is often used as a secondary route between Ketchikan and Wrangell, with boats passing by the project area as they use the Back Channel travel route. More often, independent tourists boat past the project area on their way between Ketchikan and the Anan Wildlife Observatory. Seward Passage is identified as a possible ferry route, if the State develops the proposed short-hop ferry system.

The elevation on Deer Island ranges from sea level to about 2,500 feet. The smaller islands to the west are under 500 feet in elevation. A person viewing this area sees rolling, forested hillsides, with little variety. There are visible harvest units found on the southern and southwest portion of the island. Although there are no roads on Deer Island, there is a small sortyard on the shore of the larger cove in the southwest corner of the island. This sortyard is the site of the Deer Island West LTF.

The Forest Plan expresses desired future conditions for different areas on the Tongass National Forest in terms of Visual Quality Objectives (VQO's). VQO's are used to describe the existing condition of the landscape (determined by past activities), and define the allowable extent of alteration one might notice when looking across a landscape. There are five VQO's described in the Forest Plan Standards and Guidelines. A brief description of allowable alterations for each VQO follows:

Preservation VQO - Management activities are generally not allowed in this setting. The landscape is allowed to evolve naturally.

Retention VQO - Management activities are not evident to the casual Forest visitor.

Partial Retention VQO - Management activities may be evident, but are subordinate to the characteristic landscape.

Modification VQO - Management activities may dominate the characteristic landscape, but will, at the same time, use naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed as middleground (1/4 to 5 miles from viewer).

Maximum Modification VQO - Management activities may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background.

Seen areas proposed for harvest are within the Modified Landscape Land Use Designation (LUD), as identified by the Forest Plan. The Forest Plan requires that proposed activities within the Modified Landscape LUD must meet the Partial Retention VQO in foreground distance zones, and the Modification VQO in middle and background distance zones; in areas viewed from Visual Priority Routes and Use areas.

The project area also contains acres within the Timber Production LUD, but those areas are not seen from Visual Priority Routes. Other LUD's in the project area include Old Growth Habitat and Semi-Remote Recreation (harvest is not proposed in these LUD's).

Priority Use Areas and Viewpoints

Visual Priority Routes and Use Areas are identified in Appendix F of the Forest Plan. Routes and use areas with views of the project area include: Ernest Sound (Alaska Marine Highway and Tour Ship Routes); Seward Passage (Other Travel Routes); Santa Anna Creek and Lake (Recommended Wild, Scenic, and Recreation Rivers); Frosty Bay (Saltwater Use Areas, Boat Anchorages); and South Deer Island (Boat Anchorages).

For planning and analysis purposes, the scenic resource is described in terms of viewpoints. Five viewpoints were identified around Deer Island, taking into account the Visual Priority Routes and Use Areas identified in the Forest Plan (see Figure Scenery-1). These viewpoints represent the changing views one would encounter as they circumnavigate Deer Island from the northern tip in a clockwise direction.

Recreation Places are important inventoried recreation use areas within the Tongass National Forest. The Kuakan Project area contains four inventoried Recreation Places: Deer Island - Southwest Side (#22040.00); Deer Island - Northwest Side (#22040.01); Deer Island - North (#22041.00); and Niblack Islands (#22042.00). Effects to the scenery surrounding recreation places are arguably the most important factor in changing the character of a given recreation place. In reading the Recreation section of this EIS, however, you may notice that the viewpoints chosen to display effects to scenery do not correspond with the recreation places listed. This is because recreation places are generally found on land or very close to land, with limited views of the project area. Effects to scenery are better described from viewpoints along travel routes (roads or waterways). For a better understanding of expected changes to the Recreation Places, please see the Recreation section of this document.

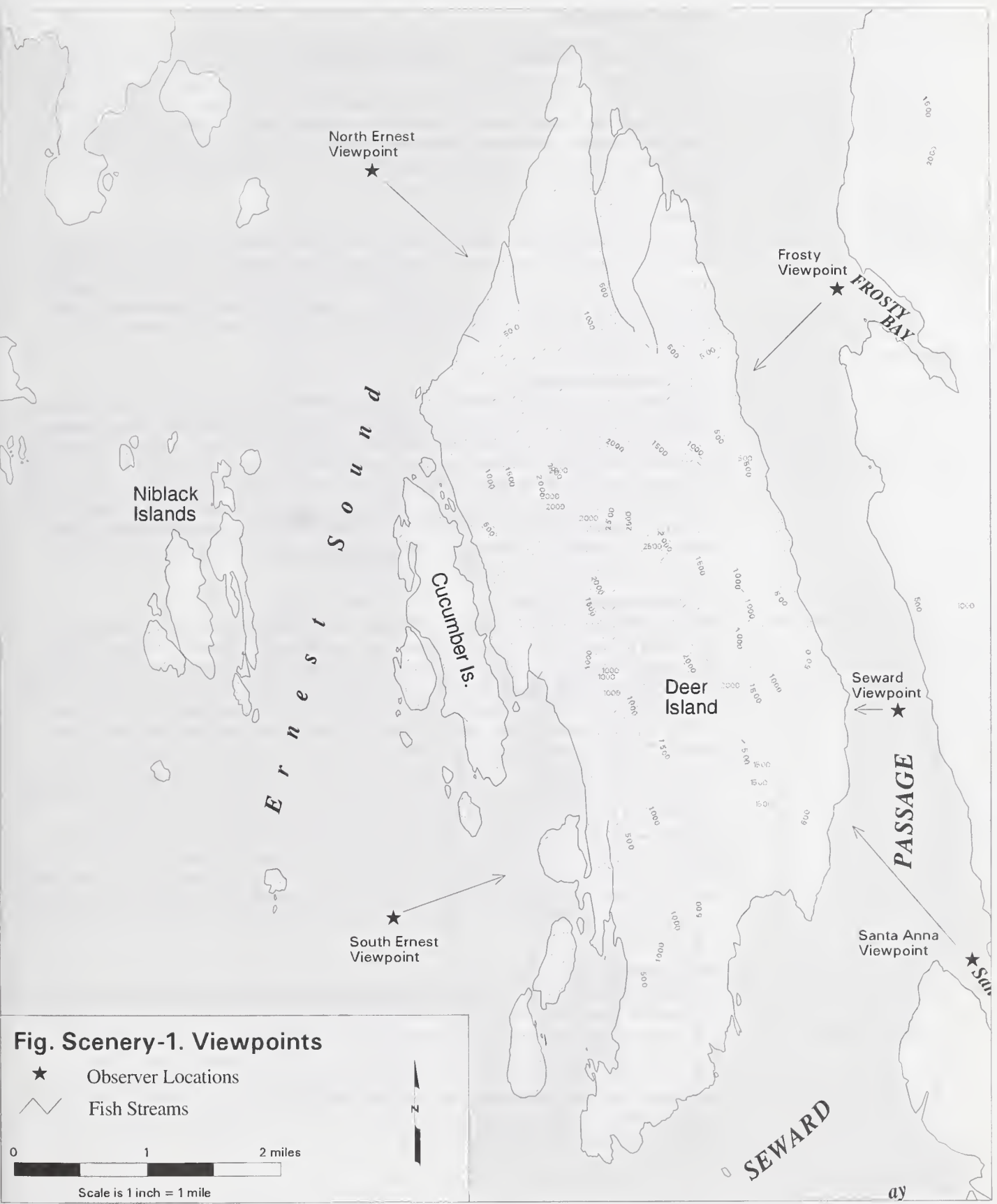


Fig. Scenery-1. Viewpoints

★ Observer Locations

~ Fish Streams

0 1 2 miles

Scale is 1 inch = 1 mile

Frosty Viewpoint

The Frosty Viewpoint describes the view one would have from the mouth of Frosty Bay, looking in a southwesterly direction towards Deer Island. In terms of Visual Priority Routes and Use Areas listed in the Forest Plan, this viewpoint represents views from the Seward Passage travel route and the Frosty Bay boat anchorage and saltwater use area. From this viewpoint, the landscape consists of heavily forested, rolling hills with little variety in landform. There are no existing harvest units visible within the project area (although the Frosty Bay area is heavily modified on the mainland). The existing condition of the view meets the requirements for the Retention VQO.

Seward Viewpoint

The Seward Viewpoint describes the view one would have from mid-channel in Seward Passage looking directly west towards Deer Island. This viewpoint represents one view from the Seward Passage travel route. From this viewpoint, the landscape is a heavily forested, steep hillside, with very little landform variety. There are no existing harvest units visible from this viewpoint. The existing condition of the view meets the requirements for the Retention VQO.

Santa Anna Viewpoint

The Santa Anna Viewpoint describes the view from the mouth of Santa Anna Inlet looking northwest towards Deer Island. This viewpoint represents views from the Seward Passage travel route and the Santa Anna Wild and Scenic River (recommended). From this viewpoint, the landscape consists of heavily forested lowlands on the southern tip of Deer Island, rolling gently to higher elevations as you look northward. There is very little landform variety from this vantage point. Harvest units from a 1989 sale are visible, but the unit lines blend in well with the surrounding landscape. There has been considerable regeneration within the units since harvest, which helps to mitigate the visual effect. The existing condition of the view meets the requirements for the Partial Retention VQO.

South Ernest Viewpoint

The South Ernest Viewpoint describes the view seen from a point in Ernest Sound lying southwest of Deer Island. The direction of view is looking northeast towards Deer Island. This viewpoint represents views from the Ernest Sound Marine Highway route and the South Deer Island boat anchorage. The landscape consists of lower elevation lands on the southern tip of Deer Island, which roll into higher elevations as you look northward. The hills are heavily forested, with a higher degree of landform variety than on the eastern side of Deer Island. The landform is typified by a lowland area near the shore which rolls back into a hidden shelf, then pitches to a steeper face in the higher elevations. There are harvest units visible from a 1989 sale. One unit in particular has very geometric side and backlines which do not blend well with the typical lines found elsewhere in the landscape. The unit is low-mid slope, with the existing elevation shelf mitigating the apparent size. The unit is hidden somewhat by unharvested trees in the foreground, with the regeneration over the last 10 years helping greatly to blend it into the landscape. When first harvested, the view would have likely met the Modification VQO. However, the regeneration within the unit has helped to "heal" the visual impact of past harvest, and the existing condition of the view meets the Partial Retention VQO.

North Ernest Viewpoint

The North Ernest Viewpoint describes the view seen from a point in Ernest Sound lying northwest of Deer Island, looking southeast towards Deer Island. This viewpoint represents views from the Ernest Sound Marine Highway route. The landscape consists of heavily forested lowlands on the northern tip of Deer Island, which pitch quickly up to higher elevations as you look southward. The landform contains a relatively high degree of variety, with deep v-notches and hidden bowls scattered throughout the higher elevation lands. There are no existing harvest units visible from this viewpoint. The existing condition of the view meets the requirements for the Retention VQO.

Environmental Consequences

The following discussion provides a narrative describing the visual impacts one would notice while viewing the different alternatives from the five viewpoints. With each viewpoint, the discussion begins with the least noticeable alternatives, describing the visual impacts a viewer would observe, and ending with the most noticeable of the proposed alternatives.

In the beginning of the discussion under each viewpoint, a table is provided. The table displays which proposed units are visible from the viewpoint in each alternative; what VQO each alternative meets from that viewpoint; and provides a relative ranking of the alternatives from that viewpoint (a ranking of 1 being the least noticeable of the alternatives, and 6 being the most noticeable).

The VQO's listed in the table display which VQO each alternative would meet as a whole, taking in all the units proposed in the given alternative; rather than rating each unit with a VQO. The Forest Plan Standards and Guidelines for Scenery (Chapter 4) provide guidance in what type of harvest prescriptions and size of units generally meet given VQO's. A determination was made for each alternative, based on the subjective description provided in the Scenery Affected Environment for each VQO. In the VQO rating, the labels are as follows: R = Retention VQO; PR = Partial Retention VQO; and M = Modification VQO. Some alternatives received a combined VQO rating (i.e.: M/PR), meaning that the alternative easily meets the first VQO listed, and would likely approach meeting the second.

Priority Use Areas and Viewpoints

Frosty Viewpoint

Table Scenery - 1
Units Seen; VQO's Met; and Relative Ranking of Alternatives from the Frosty Viewpoint

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Visible Units	None	1 3 4 5 7 8 9 10 11 12A 12C 12D 13A 13B	1 3 4 5 7A 7B 8 9 10 11 12 13	1 3 4A 7C 8 9 10 12 12A 13	32 34	8 10A 11A 12
VQO met from the Frosty Viewpoint	R	M	M	M/PR	PR/R	PR
Relative ranking of alternatives from the Frosty Viewpoint	1	6	5	4	2	3

Figures Scenery-2 through Scenery-7 display the view one would see from the Frosty Viewpoint, for all six alternatives. These computer generated 3D terrain models are limited in that they only show the outline of the units, and are unable to display the retention proposed in each unit, or the foreground trees which would help screen the units from view. Each unit is labeled on the first line showing the unit number and acres treated. The second line of the label shows the prescription (CC=clearcut, PC = patch cut, OR = overstory removal, GS = group selection, IG= individual tree marking); the amount of retention proposed; and the yarding method proposed (C= cable, H= helicopter). For example, a unit with the label OR25R(H) would be a unit with a overstory removal harvest method, leaving 25% of the commercial trees in the unit, yarded by helicopter. A unit labeled CC15R(C) would be a unit with a clear cut harvest method, leaving 15% of the trees in the unit, yarded by cable. Units labeled with "ltm" behind the prescription code (ie: CCltm) are clearcut units with leave tree marking. Computer generated, 3D terrain models for the other viewpoints are available in the Scenery Resource Report.

Alternative 1 (see Figure Scenery-2) would result in no change to the existing view. Alternative 5 (see Figure Scenery-6) has the least impact of the proposed alternatives. One would likely not notice the units (32 and 34) that are seen from this viewpoint, because the 25-35% removal would result in a textural change with no visible unit boundaries. Alternative 5 would meet the requirements for the Partial Retention VQO, and would likely approach the Retention VQO, as the casual observer would probably not notice any alteration in the landscape.

Alternative 6 (see Figure Scenery-7) would result in little noticeable change to the existing view. However, even the casual observer may notice the patch cuts proposed in Unit 10A. Units 8 and 12 propose an overstory removal, with 15% retention; and Unit 11A proposes a group selection harvest with 75% retention. These units would blend in well with the landscape, but would likely be noticeable. Alternative 6 would meet the Partial Retention VQO from this viewpoint.

Alternative 4 (see Figure Scenery-5) would result in more obvious alterations from this viewpoint, because there are many units proposed which would be visible (see Table 1). However, the harvest prescriptions (ranging from group selection to overstory removal with 15-25% retention) combined with the proposed helicopter yarding method, would result in alterations that blend in well with the landscape. Alternative 4 would meet the requirements for the Modification VQO, and would likely approach the Partial Retention VQO.

Alternatives 2 (see Figure Scenery-3) and 3 (see Figure Scenery-4) have similar effects from this viewpoint. Both propose visible cable-yarded units, which are inherently more noticeable than helicopter-yarded units. Alternative 2 would have the most impact, because of the longer road proposed (thus more cable harvested units with clearcut prescriptions). Both alternatives propose units with lines that blend well with the landscape, and all units have at least 15% retention. Alternatives 2 and 3 would meet the Modification VQO.

Figure Scenery-2: Alternative 1 (No Action) Viewed from the Frosty Viewpoint



Figure Scenery-3: Alternative 2 Viewed from the Frosty Viewpoint

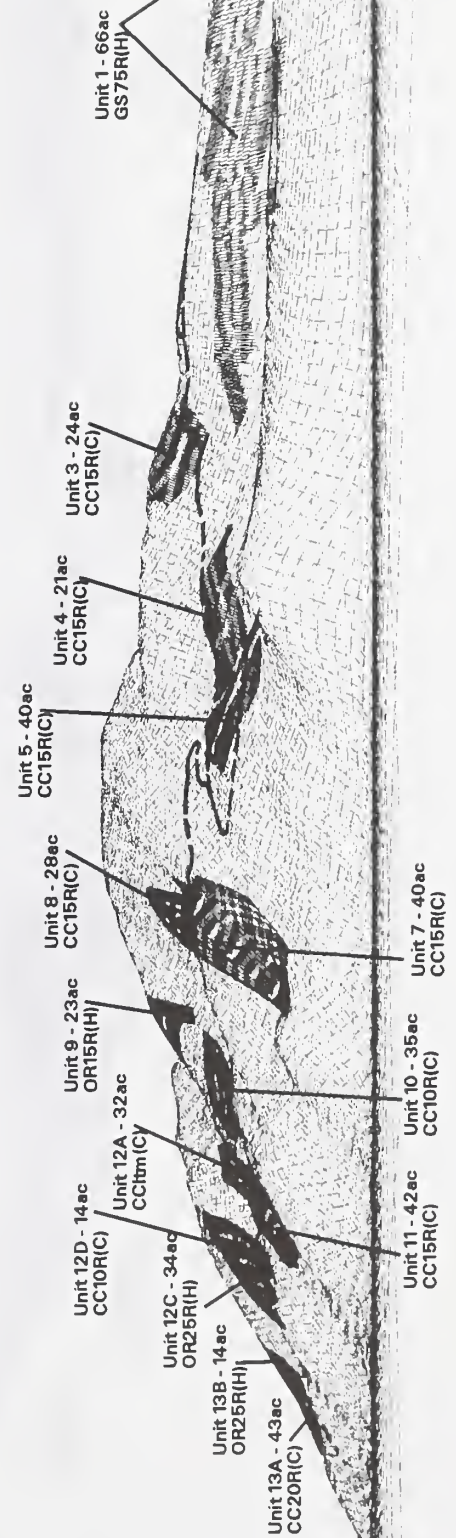


Figure Scenery-4: Alternative 3 Viewed from the Frosty Viewpoint

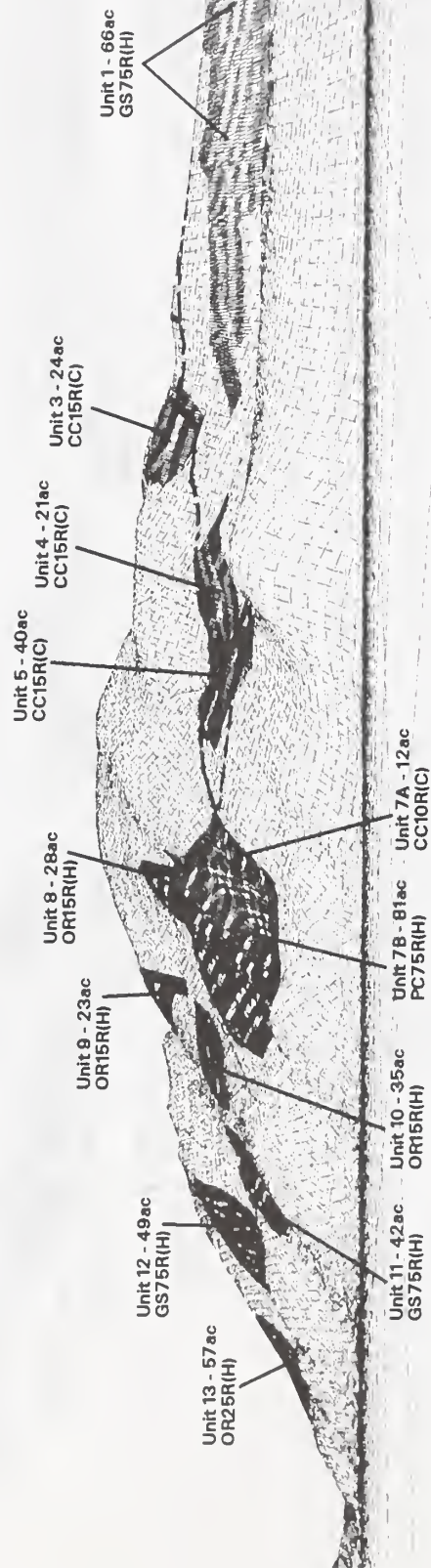


Figure Scenery-5: Alternative 4 Viewed from the Frosty Viewpoint

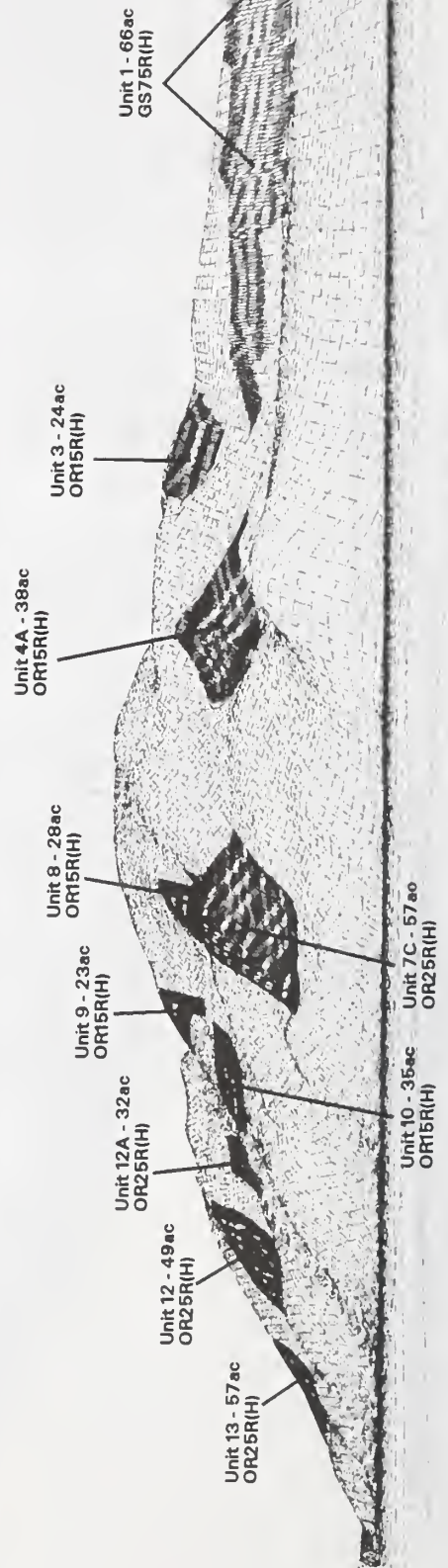


Figure Scenery-6: Alternative 5 Viewed from the Frosty Viewpoint

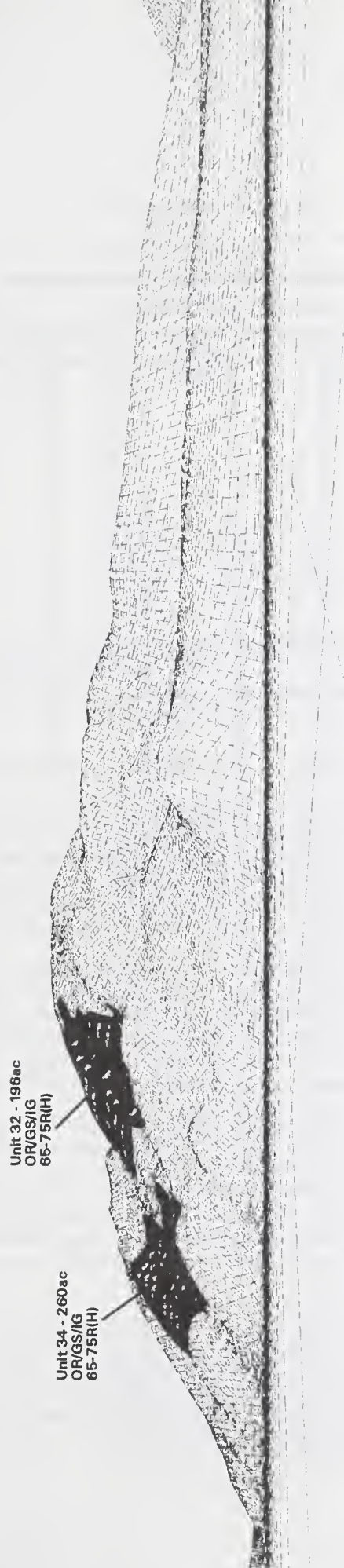
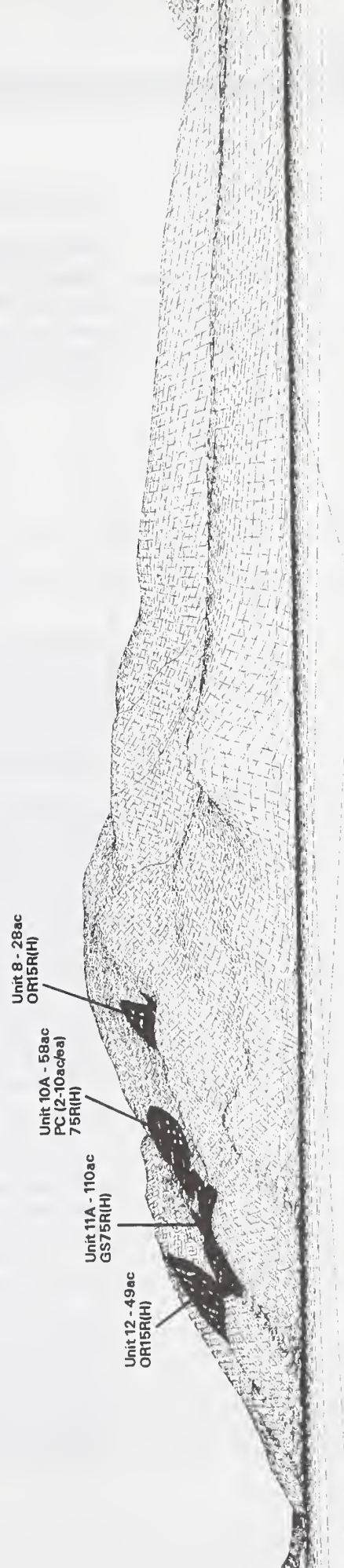


Figure Scenery-7: Alternative 6 Viewed from the Frosty Viewpoint



3 Environment and Effects

Seward Viewpoint

Table Scenery - 2
Units Seen; VQO's Met; and Relative Ranking of the Alternatives from the Seward Viewpoint

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Visible Units	None	8 9 10 11 12A 12C 12D 13A 13B 14 15 16	7B 8 9 10 11 12 13 14	8 9 10 12 12A 13 14 15 16	32 34 35	8 10A 11A 12 17A 28
VQO met from the Seward Viewpoint	R	M	M/PR	M/PR	PR/R	PR
Relative ranking of alternatives from the Seward Viewpoint	1	6	4	5	2	3

Alternative 1 would result in no change to the existing view. Alternative 5 has the least impact of the proposed alternatives, proposing to harvest Units 32, 34, and 35 with group selection (groups not exceeding 2 acres in size), diameter limits, or individual tree removal. This alternative would retain 65-75% of the existing stand, which would result in a textural change which might not be noticeable to the casual observer. Alternative 5 would meet the Partial Retention VQO, and may approach the requirements for the Retention VQO.

Alternative 6 would have little visual impact from the Seward Viewpoint. All visible harvest would be yarded by helicopter. Units 8, 12, 17A, and 28 would propose to retain 10-15% of the trees, and though they would be noticeable, they would blend well into the landscape. Unit 11 would be harvested in small groups, and Unit 10A would be harvested in patches of 2-10 acres. These units would be noticeable, but the small size of the openings would mitigate the visual effect. Alternative 6 would meet the requirements for the Partial Retention VQO.

Alternatives 3 and 4 would have similar visual effects from the Seward Viewpoint. Both have several visible units (see Table 1), with all units proposing helicopter yarding. The proposed retention strategy for units visible from this viewpoint ranges from 15-25%, which will greatly mitigate the visual impact of the alternatives. Alternative 4 would have a greater visual impact than Alternative 3 because it proposes more units (Units 15, 16, and 12A) which would be seen from this viewpoint. Alternatives 3 and 4 would meet the requirements for the Modification VQO, yet may approach the Partial Retention VQO because of the retention proposed in the units.

Alternative 2 would have the most impact to the visual resource, mainly due to the proposed road and associated cable harvest. There are several units visible from this viewpoint (see Table Scenery-2), but the design of the unit boundaries will help to blend them into the landscape. All cable units have some retention proposed (ranging from leave trees for marten habitat in Unit 12A to 15% retention in reserves and leave trees in Units 8, 11, and 14). This retention strategy will further mitigate visual concerns. Alternative 2 will meet the requirements for the Modification VQO.

Santa Anna Viewpoint

Table Scenery -3

Units Seen; VQO's Met; and Relative Ranking of the Alternatives from the Santa Anna Viewpoint

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Visible Units	None	13A 13B 14 15 16 17 20	13 14	13 14 15 16 17 20	32 34 35 36	17A 20A 28
VQO met from the Santa Anna Viewpoint	PR	M	PR	M/PR	PR	M/PR
Relative ranking of alternatives from the Santa Anna Viewpoint	1	6	3	4	2	5

Alternative 1 would result in no change to the view from the Santa Anna Viewpoint, and with the existing harvest units visible from this viewpoint, meets the Partial Retention VQO.

Alternative 5 would have the least impact of the proposed action alternatives. Unit 35 would be visible from this viewpoint, but may not be noticeable to the casual viewer, because the proposed retention of 65-75% would result in a textural change with no noticeable outline of the unit. Although Units 32, 34, and 36 are partially visible from this viewpoint, it is unlikely that they will be noticeable because they are viewed at oblique angles, and the retention strategy would mitigate any visual concerns. Alternative 5 would meet the requirement for the Partial Retention VQO.

Alternative 3 and 4 would have similar impacts from this viewpoint, as both propose helicopter yarding of units with 25% retention. Alternative 3 proposes harvest of Units 13 and 14, which are seen at oblique angles from this viewpoint. Alternative 3 would meet the requirements for the Partial Retention VQO. Alternative 4 proposes those same units, with the addition of Units 15, 16, and 17. Unit 16 is viewed at an oblique angle, but Units 15 and 17 are viewed more "straight on" from this viewpoint. Outlines of Units 15 and 17 would probably be noticeable. A small portion of Unit 20 is also visible, though would likely not be noticeable. Because of the higher amount of proposed harvest and the angle of the views, Alternative 4 may not meet the requirements for the Partial Retention VQO, but would easily meet the Modification VQO.

Alternative 6 proposes fewer visible units than Alternative 4, but would have a higher visual impact because less retention (10%) is proposed in the visible units. Unit 17A is viewed "straight on" from this viewpoint, and although the design of the unit boundary would help to mitigate the visual effect, the lower amount of retention would result in an obvious outline of this unit. Additional harvest of Unit 28 and visible portions of Unit 20A would be noticeable (both propose 10% retention), with visible unit boundaries. Alternative 6 may not meet the Partial Retention VQO, but would easily meet the Modification VQO.

Alternative 2 would have the most visual impact from the Santa Anna Viewpoint. Cable harvest of Units 13A and 14 would be easily noticeable, and the boundaries of patch cuts in Unit 15 would be viewed straight on from this viewpoint. Design of the unit boundaries to fit the landscape will help to mitigate the visual effect. Other units visible from this viewpoint include Units 13B, 15, 17, and portions of Unit 20. These units are proposed for helicopter yarding with 25% retention, which will mitigate the visual impact. Alternative 2 would meet the Modification VQO.

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South Ernest Viewpoint

Table Scenery -4

Units Seen; VQO's Met; and Relative Ranking of the Alternatives from the South Ernest Viewpoint

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Visible Units	None	18 20	18	18 20	33 36 37	18 18A 19A 19B 20A 24 25 29 30
VQO met from the South Ernest Viewpoint	PR	PR	PR	PR	PR	M/PR
Relative ranking of alternatives from the S. Ernest Viewpoint	1	4-5 (same)	3	4-5 (same)	2	6

Alternative 1 would result in no change to the view from the South Ernest Viewpoint. Because of the existing harvest units which are visible from this viewpoint, Alternative 1 meets the Partial Retention VQO.

Alternative 5 would have the least visual impact of the action alternatives proposed. Units 33, 36 and 37 are visible from this viewpoint, but the irregular unit boundaries and 65-75% retention would result in a textural change which may not be noticeable. Alternative 5 would meet the Partial Retention VQO.

Alternative 3 would have little visual impact from this viewpoint. The only visible unit is Unit 18, which proposes helicopter yarding with 25% retention. This unit will likely be noticeable, but will blend in well with the landscape. Alternative 3 would meet the Partial Retention VQO.

Alternatives 2 and 4 have the same impact from this viewpoint. Both propose the harvest of Unit 18 (as described above in Alternative 3), with the additional harvest of Unit 20. Unit 20 would also be helicopter yarded with 25% retention, and though noticeable, would blend in well. Alternatives 2 and 4 would meet the Partial Retention VQO.

Alternative 6 would have the most visual impact from this viewpoint. Unit 20A would be the most noticeable because it harvests along a ridgetop. The 10% retention proposed in Unit 20A would help to mitigate the impact. Units 18A, 19A, and 19B would be clearcut, but the small size and unit design would help to blend them into the landscape. Unit 24 proposes a patch cut prescription, with 50% of the stand removed. These openings would be noticeable (2-10 acres each), but their small size and unit design would mitigate visual effects. This alternative also proposes harvesting Units 18 and 25 with 25% retention. Units 29 and 30 would be viewed at very oblique angles, and may not be noticeable from this viewpoint. Alternative 6 would easily meet the Modification VQO; and because of the small size of openings and retention proposed in larger openings; may approach the Partial Retention VQO.

North Ernest Viewpoint

Table Scenery -5
Units Seen; VQO's Met; and Relative Ranking of the Alternatives from the North Ernest Viewpoint

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Visible Units	None	2A 2D	2A 2D	2A 2D	31	2 29 30
VQO met from the North Ernest Viewpoint	R	M/PR	M/PR	M/PR	PR/R	PR
Relative ranking of alternatives from the N. Ernest Viewpoint	1	5-6 (same)	5-6 (same)	4	2	3

Alternative 1 would result in no change to the existing view. Alternative 5 would have the least visual impact of the action alternatives proposed. Unit 31 is visible from this viewpoint, but the irregular unit boundary and 65-75% retention would result in a textural change which may not be noticeable. Alternative 5 would easily meet the Partial Retention VQO, and may approach the requirements for the Retention VQO.

Alternative 6 would have little visual impact from this viewpoint. Units 29 and 30 would be viewed at oblique angles, and may not even be noticeable. Unit 2 would be viewed straight on, but the patch cut prescription with 67% retention would result in small openings. Patches would be designed to blend in well with the landscape. Alternative 6 would meet the Partial Retention VQO.

Alternative 4 would also have little visual impact from this viewpoint. Units 2A and 2D are proposed with 15% retention. Because the units are viewed straight on from this viewpoint, Alternative 4 may not meet the Partial Retention VQO, but would easily meet the Modification VQO.

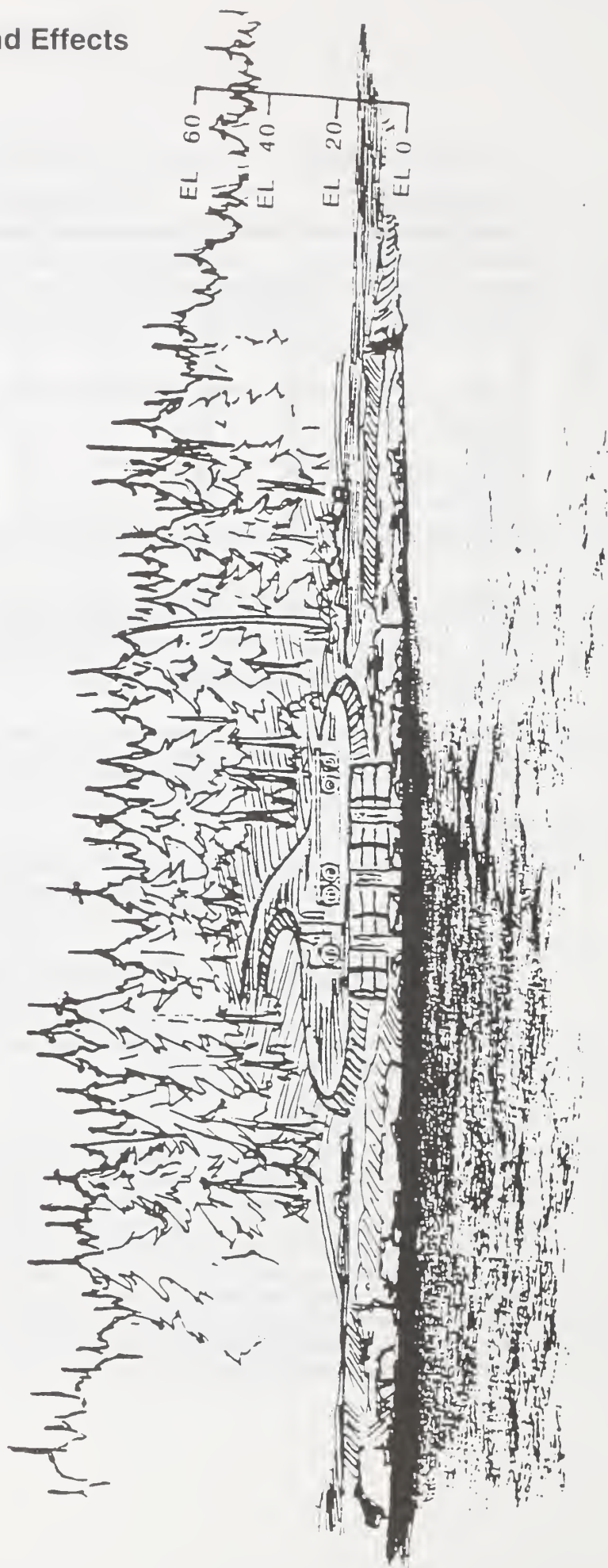
Alternatives 2 and 3 have the same visual impact from this viewpoint. They propose harvest of Units 2A and 2D (like Alternative 4). In Alternative 2, Unit 2A would be cable harvested with 15% retention, which may result in a slightly higher visual impact than Alternative 4. Still, Alternatives 2 and 3 would easily meet the Modification VQO, and may approach the requirements for the Partial Retention VQO.

Visual Effect of the LTF

Alternatives 2 and 3 propose the construction of a Log Transfer Facility (LTF) at the north end of Deer Island. This affected area is within the foreground distance zone of a Modified Landscape LUD. The Forest Plan requires that activities proposed in these areas meet the Partial Retention VQO, but makes special exceptions for facilities such as LTF's. This proposed LTF will be designed to have the least visual effect practical, utilizing the screening effect of trees where possible. Some rock will have to be developed at the LTF site, but the first substantial rock source is 0.36 miles from the LTF, and should not be readily visible from the water. Appendix D contains detailed information about design criteria and LTF effects. Figure Scenery-8 shows a conceptual drawing of how this LTF is likely to look from the water. This LTF will meet the requirement for the Modification VQO. Alternatives 1, 4, 5, and 6 do not propose construction of an LTF.

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Fig. Scenery - 8 Kuakan North LTF



Silviculture and Timber Management

Additional background on forest land classification, silvicultural and logging systems, and other related topics may be found in the Forest Plan FEIS (Chapter 3: "Timber" and Appendix G). Applicable direction is contained in the Forest Plan (Chapter 2; Chapter 3: Timber Production and Modified Landscape Land Use Designations; Chapter 4: Forest-wide Standards and Guidelines; and Appendix A). Additional information relating to the Kuakan project is included in the Silviculture and Timber Resource Reports in the planning file.

Forest Land Classification

Affected Environment

The natural vegetation of the Kuakan Project Area is a mosaic of coniferous forest interspersed with nonforested plant communities such as muskeg (bog), shrubland, estuarine, riparian and beach fringe plant communities. The area contains six forested plant series (climax communities). The plant associations are western hemlock series; western hemlock-yellow-cedar series; mountain hemlock series; western hemlock-western red cedar series; Sitka spruce series and mixed conifer series. Together these (and other forested climax communities in other areas) are loosely termed "old growth forest." The Biodiversity and Old Growth section of this chapter discusses aspects of old-growth forest not related to forest products.

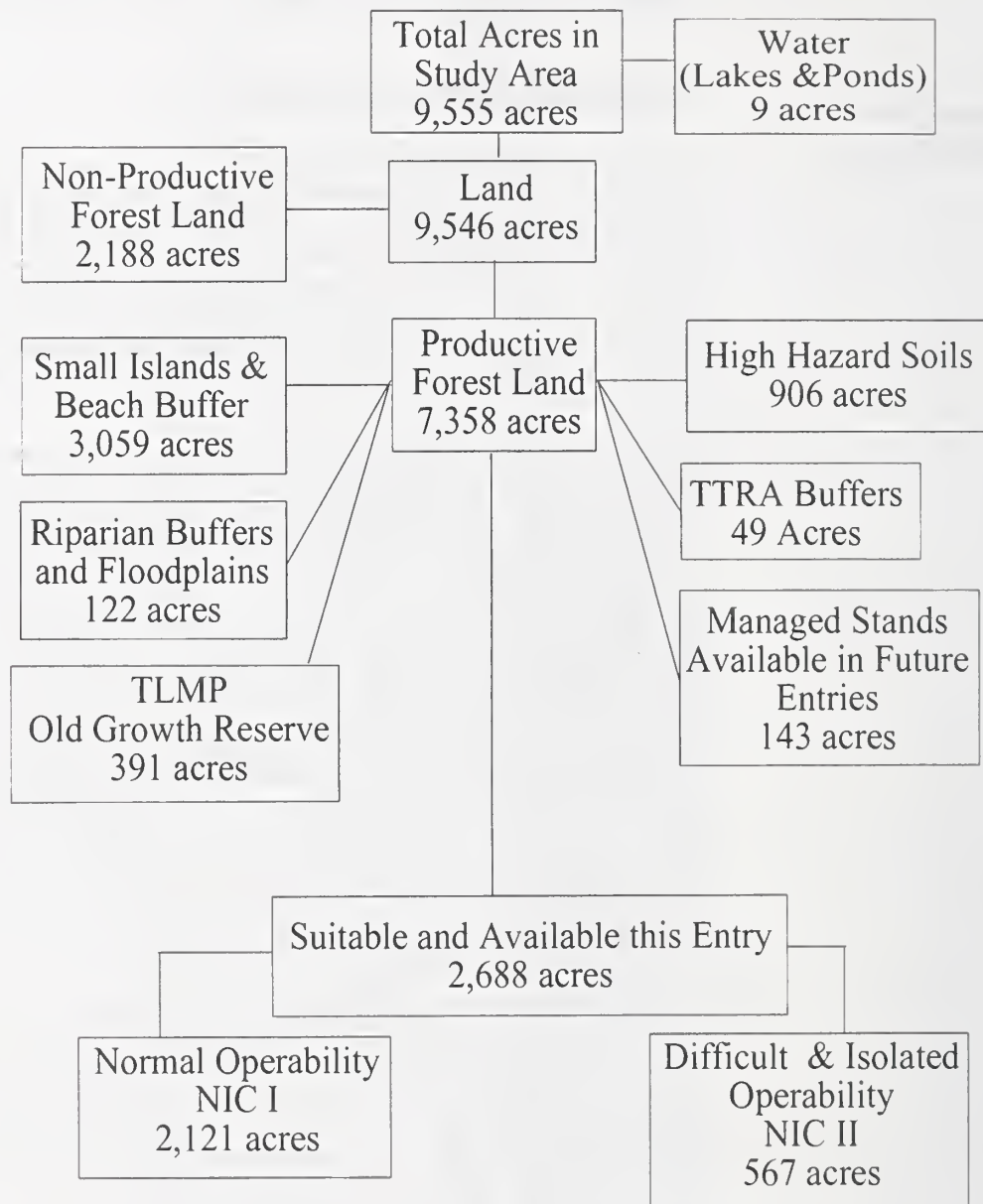
National Forest System lands are defined by vegetative cover and administratively or congressionally designated land use. The Forest Plan (Appendix A) provides a detailed discussion of timber resource land suitability. This classification scheme is intended to show the amount of land that is covered by forest vegetation with further divisions to show the amount of land capable of, or available for, timber production. Land that is not capable of growing commercial timber is classified as non-productive forest land. This land includes areas of bare rock, alpine meadows, peat bogs, and wetlands that only support scrub timber. To be considered suitable for timber production, forested lands must be capable of producing 20 cubic feet of tree growth annually, and/or must contain at least 8,000 board feet of net timber volume per acre. These are termed "commercial forest land" (Productive old growth is synonymous with commercial forest land. In this section, the latter terminology will be used). To be considered both suitable and available for harvest, lands must be determined tentatively suitable for timber production, and must be within a land use designation that allows timber harvest. For the Project Area, these are the Timber Production and Modified Landscape Land Use Designations. Within these designations, Forest Plan standards and guidelines also apply, making additional areas unsuitable or unavailable for timber harvest. These include but are not limited to, the beach and estuary fringe, wildlife nest or den buffers, stream buffers, and oversteepened slopes.

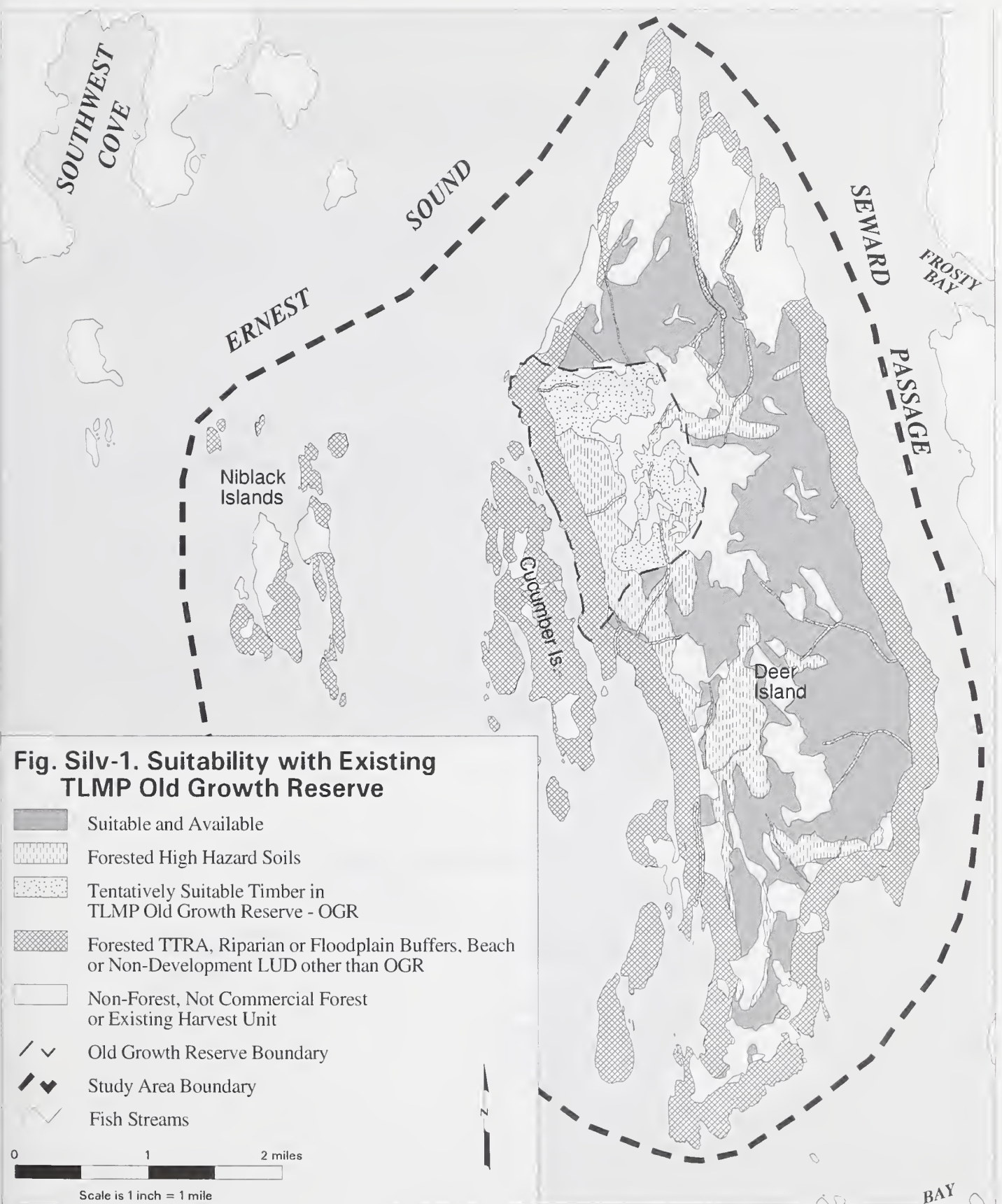
The Project Area contains about 465 acres of previously harvested areas. Past timber harvest occurred in 1930 (harvesting 9 acres), 1989 (harvesting 275 acres) and 1990 (harvesting 180 acres). These managed areas are now young, second-growth stands. The 1997 Forest Plan has classified some of these areas as unsuitable for timber management through land use designation (LUD) or inclusion in the Beach and Estuary Standard and Guide (see Figures and Tables Silv-1 to Silv-3). The remaining young growth stands (all younger than 20 years) will not be available for timber harvest until they reach about 80 to 100 years in age.

Figures and Tables Silv-1, Silv-2 and Siv-3 display the acreage classifications of land within the Project Area by old growth reserve (OGR) option. The land available for timber harvest would vary, dependent on the location of the selected old growth reserve.

Table Silv - 1

Value Comparison Unit 525 Acreage Classification TLMP OGR, Alternative 1

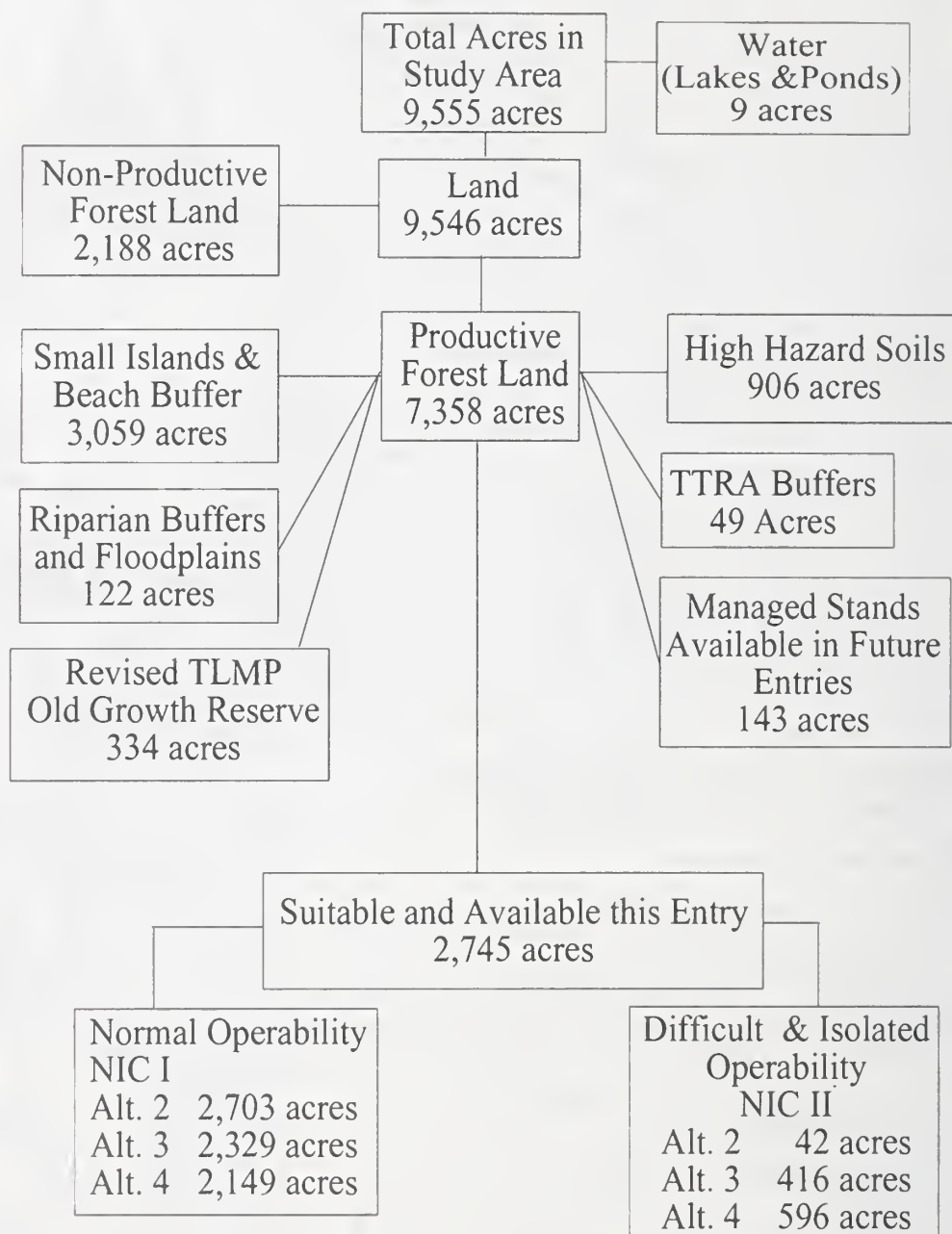


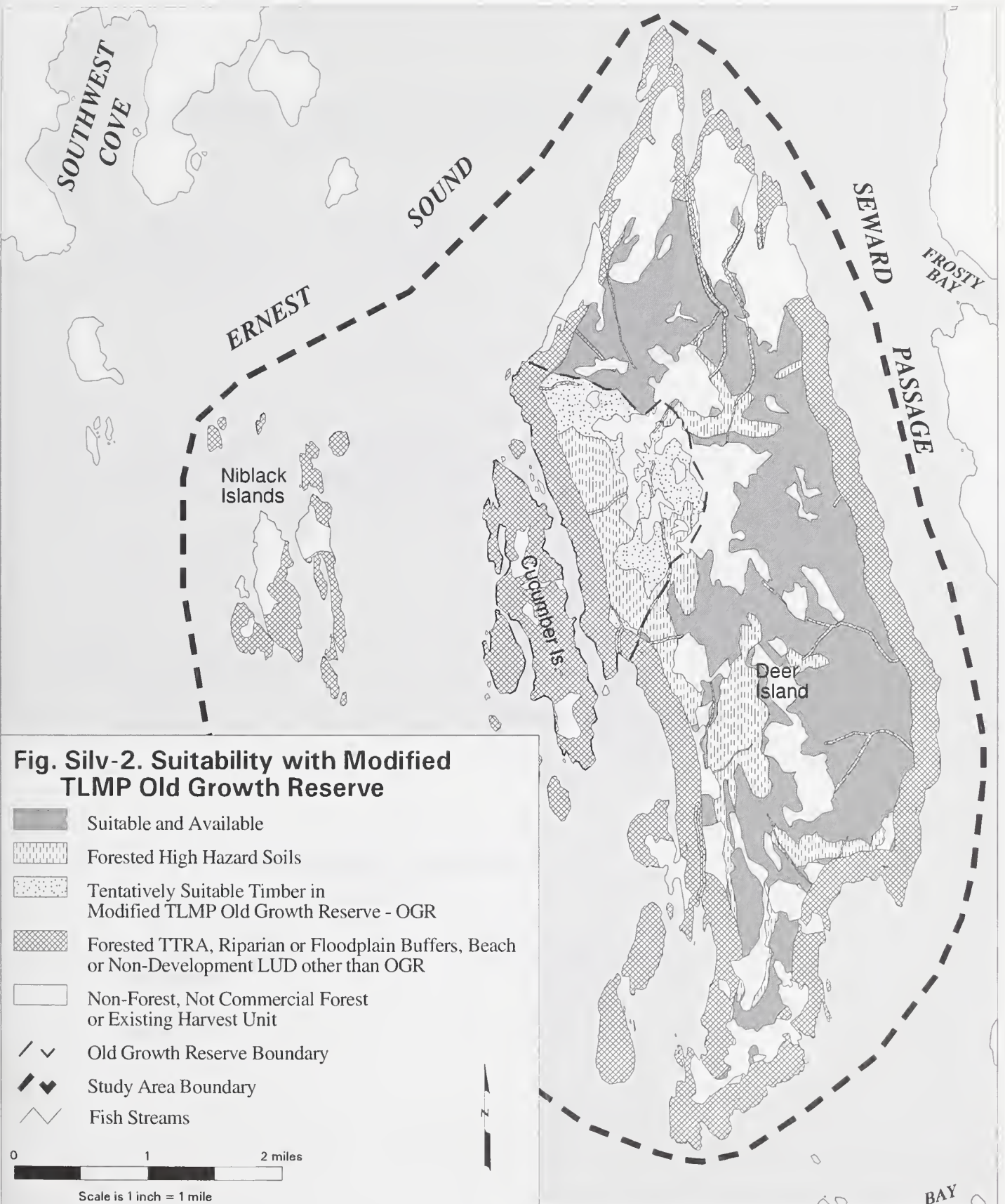


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Table Silv - 2

Value Comparison Unit 525 Acreage Classification Revised TLMP OGR, Alternatives 2, 3 & 4

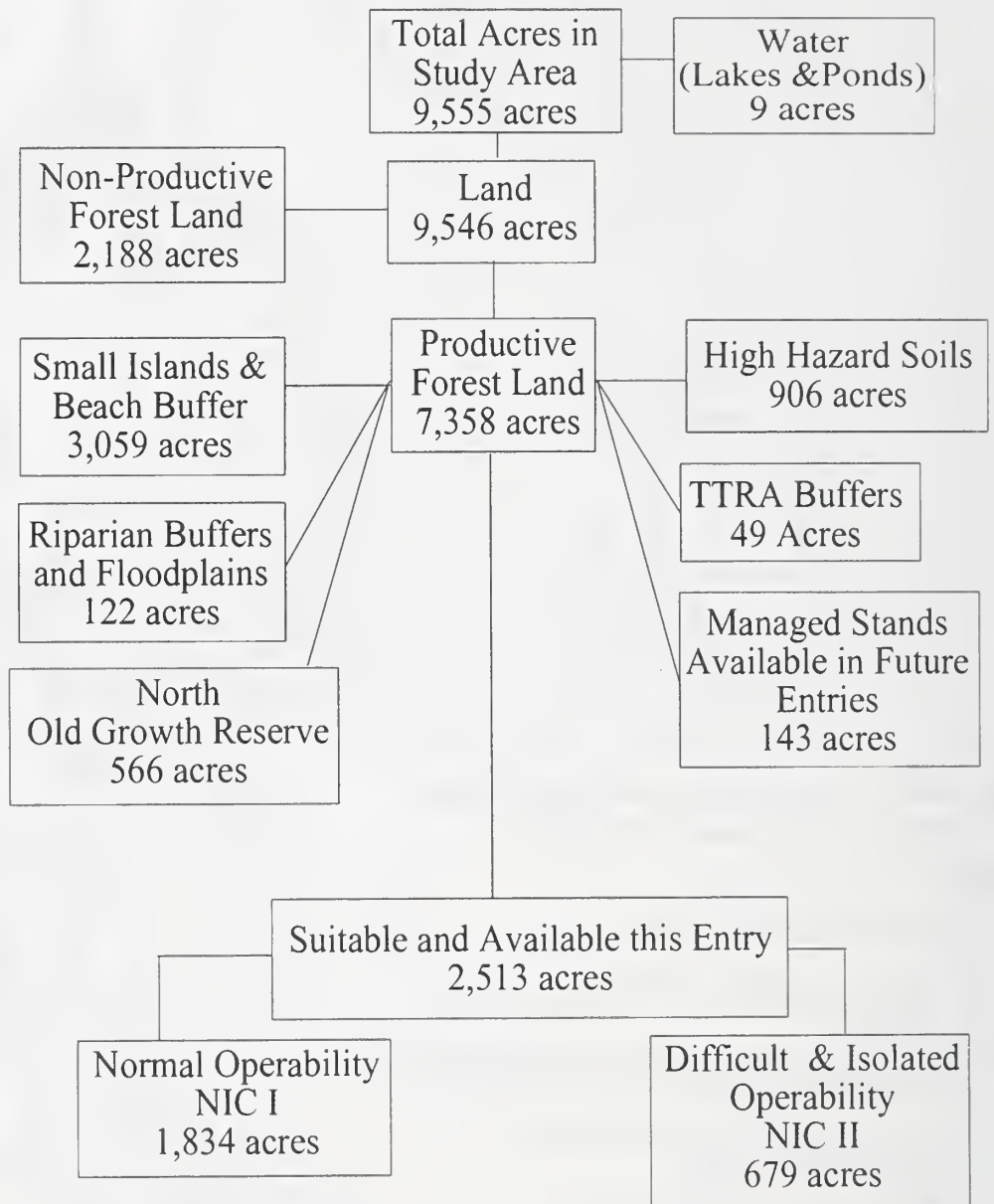


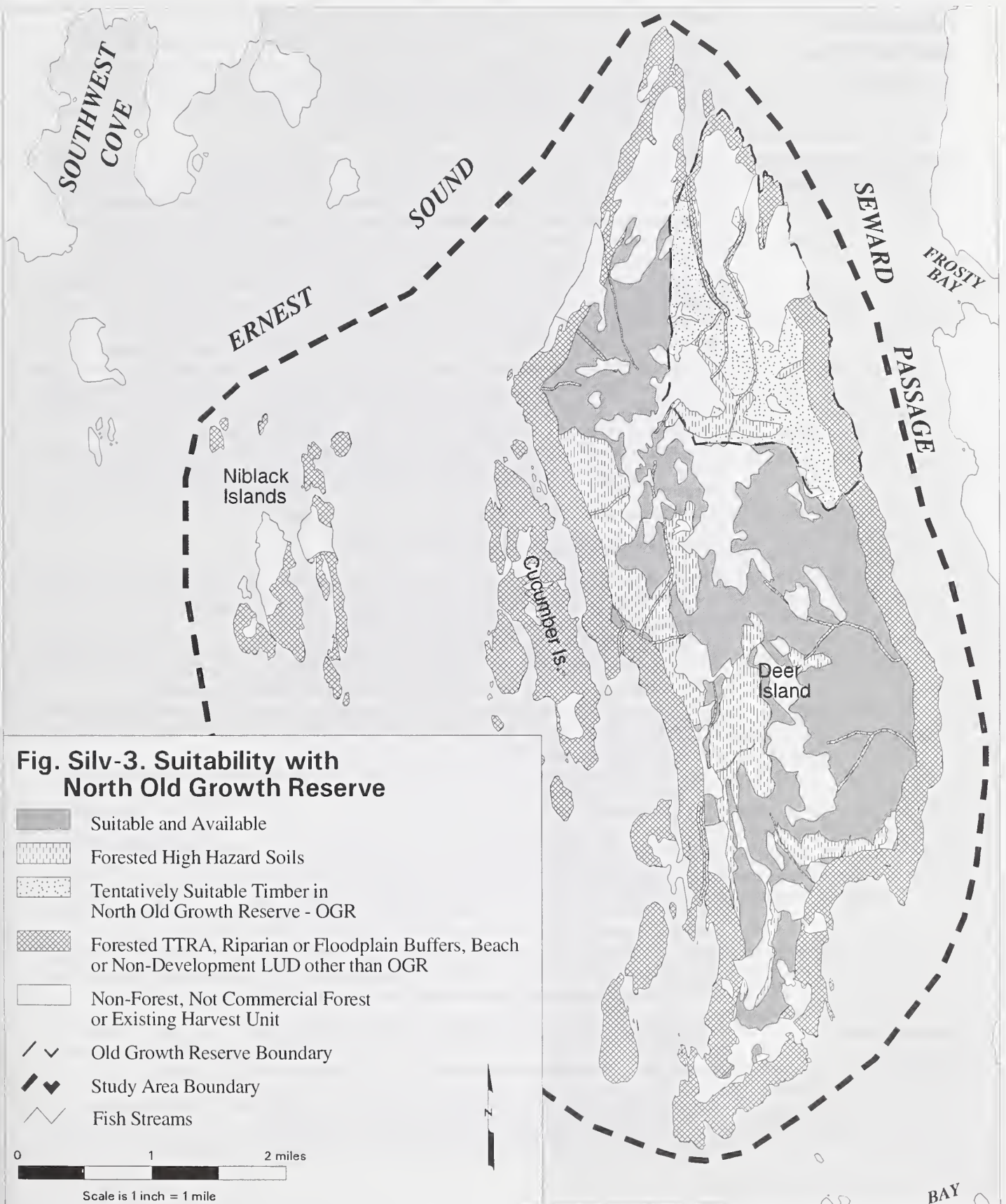


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Table Silv - 3

Value Comparison Unit 525 Acreage Classification North OGR, Alternatives 5 & 6





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Forest Plan Desired Future Condition

Stands of trees that are healthy and in a balanced mix of age classes, from very young to harvestable age, are a key part of the desired future condition for lands within the Timber Production Land Use Designation. Within the Modified Landscape designation, the desired future condition is a variety of successional stages (with less evidence of harvest in foreground areas viewed by forest visitors), that provide a range of wildlife habitat conditions. (Forest Plan, Chapter 3, pages 3-135 and 3-144).

Forest Succession After Disturbance

Wind is a major disturbance factor in Southeast Alaska, altering the structure of the forest. Windthrow was responsible for 26 percent of the annual tree mortality in Southeast Alaska during one 7-year period (Harris, 1989). Scattered windthrow of large over-mature trees is a prime cause of mortality and it creates small openings in which the advanced growth in the understory may develop or newly germinated seedlings may grow. Wind can also blow down stands covering many acres. Occasional severe storms disturb large areas, initiating secondary forest succession, creating stands of relatively uniform age and size. Areas not protected by topographic barriers from the severe effects of infrequent, major storms, are subject to catastrophic damage. Much of the forest at mid to upper elevations on the south and southeast side of Deer Island is subject to the direct effects of these windstorms. Scattered ridges with a southerly aspect on the west side of the island, and areas with a south to south east aspect on the east side of the island also appear to have disturbance from wind. The southwest corner of Deer Island is exposed to winds blowing up Clarence Strait, while the southeast corner gets the brunt of the prevailing southeast winds, but is somewhat protected by its proximity to the mainland. Reconnaissance of the island shows mostly small pockets of existing windthrow, with no evidence of large-scale windthrow resulting in extensive even-aged stands. Windthrow appears to be more prevalent on the south and west sides than on the north and east sides.

Oliver (1990) describes forest succession as follows:

1. **Stand Initiation Stage.** After a disturbance, trees and shrubs re-colonize the site. Stands developing after a major disturbance are described as 'even-aged' stands, since trees are assumed to have grown shortly after the disturbance.
2. **Stem Exclusion Stage.** As the trees continue to grow, the forest canopy closes, limiting the amount of sunlight reaching the forest floor. New trees do not appear and some of the existing ones die. The surviving trees grow larger in height and diameter.
3. **Understory Reinitiation Stage.** As trees die or are blown down, limited sunlight reaches the forest floor. Forest floor herbs, shrubs and young trees again re-colonize and survive in the understory, although they may grow very little.
4. **Old Growth Stage.** As trees in the overstory begin to die, understory trees will replace them, over time resulting in a multi-aged forest, with multiple canopy layers, which typifies the "old growth" stage.

These stages are useful as a means of predicting the changes in vegetation structure that are likely to occur after timber harvest using alternative silvicultural prescriptions. Even-aged prescriptions convert stands to the Stand Initiation Stage. Two-aged prescriptions assist stands to reach the Understory Reinitiation Stage more rapidly than even-aged prescriptions. Uneven-aged prescriptions maintain more of the stand in the Old Growth Stage. Precommercial thinning can shorten the time for a stand to reach the Understory Reinitiation Stage and increase the forage available for wildlife. Commercial thinning performed during the Understory Reinitiation Stage may add to stand structural diversity as well.

Silvicultural Systems

The term "silvicultural systems" refers to a planned process whereby a stand is harvested, re-established and tended. The system name is based on the number of age classes present after the initial harvest, such as even-aged, two-aged and uneven-aged systems.

Even-aged systems produce stands that consist of trees of the same or nearly the same age. A stand is considered even-aged if the range in tree ages normally does not exceed 20 percent of the age at which the stand is to be harvested (the "rotation age"). In general, seed tree cutting,

shelterwood cutting, and clearcutting with less than 10% retention, will produce even-aged stands.

Two-aged stands result from treatments which leave behind a substantial portion of the original stand structure in the form of large trees distributed or clumped throughout the stand. The remnant trees left on the site represent one "age class" and newly established seedlings represent another age class. Clearcutting with retention greater than 10% can result in two aged stands. If the unit is yarded using a cable system, then the retention areas will often be clumped, with one age class dominating the retention area while the cut area develops into another age class. The retention areas may have several different canopy layers and sizes of trees. If yarded with a helicopter, generally the age classes are more mixed throughout the harvest area. An overstory harvest can lead to either a two aged or uneven age stand, depending upon the trees left after harvest.

Uneven-aged systems create stands that include three or more distinctly different age classes. Uneven-aged conditions are created through management by using individual tree selection, group selection, or overstory removal methods.

The selection of the appropriate silvicultural system is dependent upon the feasibility of achieving sound management objectives. These can include objectives for species composition, stand density, growth rate, insect and disease control, and overstory condition and development. The Forest Plan and public issues are used to refine site-specific objectives. It is possible that more than one silvicultural system may be prescribed for the same site, depending upon the alternative in question.

It is important to distinguish scale when visualizing harvest treatments for individual units or stands. For instance, while the ideal condition may be to apply a treatment uniformly over an entire harvest unit, this is often not possible due to terrain, logging systems, or vegetative conditions. An objective may be to leave 50 percent of the existing trees undisturbed. However, conditions may prevent uniform distribution of retained vegetation resulting in groups of trees being left instead. This may result in what appears to be several small clearcuts, or even one larger clearcut, an extreme example. But when the entire treatment area is considered, half the trees have been retained, the prescription was followed, and resource objectives were met.

For a detailed discussion of silvicultural systems and methods, see the Forest Plan FEIS, Appendix G. Factors influencing, and criteria for selection of appropriate harvest methods and silvicultural systems, are also presented in the National Forest Management Act implementing regulations (36 CFR 219.27) and the Alaska Regional Guide.

Unit Retention and Volume Removed

The term "retention" as used in this section of the EIS has to do with the amount of trees that remain standing within a unit following the harvest of other trees within the stand. Retention can be expressed in terms of the **number of trees** retained, the **acres** of the original stand retained in clumps, or the **volume** of the original stand that remains after harvest. Retention amounts and volume removed is calculated for each harvest unit based on the units silvicultural prescription.

Retention in Group Selection and Patch Cut prescriptions are based on the **acres** retained in the unit (outside of the Groups or Patches) after harvest. For example, a 100 acre Group Selection unit with 75% retention will retain 75 acres after harvest. Harvest would occur on 25 acres in 13 or more groups, ranging in size up to 2 acres. Volume removed is based on total unit volume minus the volume in groups or patches.

Retention in Clearcut with reserves prescription is based on the total **acres** of the unit that need to be retained within the unit. For example, a 40 acre Clearcut with 15% Reserves unit will have 6 acres (15%) retained within the unit in exclusions. Clearcut harvest would occur on 34 acres. Volume removed is based on total unit volume minus the volume in exclusions.

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Retention in Overstory Removal by diameter limit prescription is based on retaining a percent of the **trees** within the unit. For example, an Overstory Removal with 25% retention by diameter limit will have 25% of the trees originally in that unit retained after harvest. This is calculated only for trees greater than 9.0" diameter at breast height (DBH). This means that there will be additional trees below 9.0" DBH retained that are not displayed in the percent retention. The reason for not including the smaller trees is based on the timber sale cruise, which only samples trees greater than 9.0" DBH. A diameter limit (lower and/or upper) is designated for each species within the unit, identifying the trees that may be harvested by their diameter. All trees within the designated diameter range will be harvested, while all trees outside that range will be retained. Volume removed is based on the estimated total unit volume minus a percentage of unit volume that represents the trees that are retained. The estimated relationship between trees removed and volume removed is based on previous information gathered from the Campbell, King George and Canal Hoya Timber Sales, which utilized diameter limit designations.

Retention in Individual/Group Selection prescription is based on retaining 65%-75% of the original **volume** within that unit. Volume removed would be between 25%-35% of the total unit volume, allowing for future entries to harvest some of the remaining volume. For the Kuakan project, we used an estimated average of 9 MBF per acre harvested this entry from units with this prescription.

Leave Tree Mark (LTM) is considered **additional retention** within a given unit. The overall percent retained is difficult to quantify for LTM prior to actual marking. The retention percent for LTM is not calculated, however, the unit volume has been adjusted to reflect volume retained due to marking. For example, a Clearcut (CC) with 15% Reserves and LTM will have 15% of the total acres retained in exclusions and additional Leave Trees will be marked if needed to meet Marten Standards and Guides or other resource objectives. In this example, volume removed is based on total unit volume minus the volume in exclusions and a percentage of unit volume (leave trees). This formula applies to all silviculture prescriptions that include LTM.

Tables Silv-4 to Silv-8 display unit retention and estimated percent of volume removed for each action alternative. The no-action alternative retains 100% of the existing stands at this time.

Table Silv - 4 Kuakan Alternative 2 Unit Retention

Unit	Silvicultural Harvest Method	Retention Based On:					Estimated Percent of Volume Removed
		Treated Acres	Harvest Acres	Percent of Acres	Trees per Acre	Percent of Volume	
1	Group Selection, retain 75%	66	17	75%	--	--	25%
2a	Clearcut with 15% reserves	38	32	15%	--	--	85%
2d	Overstory Removal with 15% retention by diameter limit	36	36	--	15%	--	96%
3	Clearcut with 15% reserves & LTM	24	20	15%	--	--	82%
4	Clearcut with 15% reserves & LTM	21	18	15%	--	--	85%
5	Clearcut with 15% reserves & LTM	40	34	15%	--	--	84%
7	Clearcut with 15% reserves	40	34	15%	--	--	85%
8	Clearcut with 15% reserves & LTM	28	24	15%	--	--	85%
9	Overstory Removal with 15% retention by diameter limit	23	23		15%	--	96%
10	Clearcut with 10% reserves & LTM	35	31	10%	--	--	88%
11	Clearcut with 15% reserves & LTM	42	36	15%	--	--	84%
12a	Clearcut with 10% reserves & LTM	32	32	10%	--	--	90-98%
12c	Overstory Removal with 25% retention by diameter limit & LTM	34	34	--	25%	--	90%
12d	Clearcut with 10% reserves & LTM	14	13	10%	--	--	91%
13a	Clearcut with 20% reserves & LTM	43	34	20%	--	--	77%
13b	Overstory Removal with 25% retention by diameter limit & LTM	14	14	--	25%	--	90%
14	Clearcut with 15% reserves & LTM	38	32	15%	--	--	83%
15	Patch Cut with LTM, 5 acres each. Retain 60% of unit	37	15	60%	--	--	40%
16	Overstory Removal with 25% retention by diameter limit	32	32	--	25%	--	92%
17	Overstory Removal with 25% retention by diameter limit	27	27	--	25%	--	92%
18	Overstory Removal with 25% retention by diameter limit	52	52	--	25%	--	92%
20	Overstory Removal with 25% retention by diameter limit	55	55	--	25%	--	92%
21	Overstory Removal with 15% retention by diameter limit	14	14	--	15%	--	96%

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Table Silv - 5 Kuakan Alternative 3 Unit Retention

Unit	Silvicultural Harvest Method	Treated Acres	Harvest Acres	Retention Based On:			Estimated Percent of Volume Removed
				Percent of Acres	Trees per Acre	Percent of Volume	
1	Group Selection, retain 75%	66	17	75%	--	--	25%
2a	Clearcut with 15% reserves	38	32	15%	--	--	85%
2d	Overstory Removal with 15% retention by diameter limit	36	36	--	15%	--	96%
3	Clearcut with 15% reserves & LTM	24	20	15%	--	--	82%
4	Clearcut with 15% reserves & LTM	21	18	15%	--	--	85%
5	Clearcut with 15% reserves & LTM	40	34	15%	--	--	84%
7a	Clearcut with 10% reserves	12	11	10%	--	--	90%
7b	Patch Cut, retain 75%, up to 5 acres each	81	20	75%	--	--	25%
8	Overstory Removal with 15% retention by diameter limit & LTM	28	28	--	15%	--	95%
9	Overstory Removal with 15% retention by diameter limit	23	23	--	15%	--	96%
10	Overstory Removal with 15% retention by diameter limit & LTM	35	35	--	15%	--	96%
11	Group Selection, retain 75%	42	11	75%	--	--	25%
12	Group Selection, retain 75%	49	12	75%	--	--	25%
13	Overstory Removal with 25% retention by diameter limit & LTM	57	57	--	25%	--	90%
14	Overstory Removal with 25% retention by diameter limit & LTM	38	38	--	25%	--	91%
18	Overstory Removal with 25% retention by diameter limit	52	52	--	25%	--	90%

Table Silv - 6 Kuakan Alternative 4 Unit Retention

Unit	Silvicultural Harvest Method	Treated Acres	Harvest Acres	Retention Based On:			Estimated Percent of Volume Removed
				Percent of Acres	Trees per Acre	Percent of Volume	
1	Group Selection, retain 75%	66	17	75%	--	--	25%
2a	Overstory Removal with 15% retention by diameter limit	38	38	--	15%	--	96%
2d	Overstory Removal with 15% retention by diameter limit	36	36	--	15%	--	96%
3	Overstory Removal with 15% retention by diameter limit & LTM	24	24	--	15%	--	95%
4a	Overstory Removal with 15% retention by diameter limit & LTM	38	38	--	15%	--	96%
7c	Overstory Removal with 25% retention by diameter limit	57	57	--	25%	--	92%
8	Overstory Removal with 15% retention by diameter limit & LTM	28	28	--	15%	--	95%
9	Overstory Removal with 15% retention by diameter limit	23	23	--	15%	--	96%
10	Overstory Removal with 15% retention by diameter limit & LTM	35	35	--	15%	--	96%
12a	Overstory Removal with 25% retention by diameter limit & LTM	32	32	--	25%	--	91%
12	Overstory Removal with 25% retention by diameter limit & LTM	49	49	--	25%	--	90%
13	Overstory Removal with 25% retention by diameter limit & LTM	57	57	--	25%	--	90%
14	Overstory Removal with 25% retention by diameter limit & LTM	38	38	--	25%	--	91%
15	Overstory Removal with 25% retention by diameter limit & LTM	37	37	--	25%	--	90%
16	Overstory Removal with 25% retention by diameter limit	32	32	--	25%	--	92%
17	Overstory Removal with 25% retention by diameter limit	27	27	--	25%	--	92%
18	Overstory Removal with 25% retention by diameter limit	52	52	--	25%	--	92%
20	Overstory Removal with 25% retention by diameter limit	55	55	--	25%	--	92%
21	Overstory Removal with 15% retention by diameter limit	14	14	--	15%	--	96%

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Table Silv - 7 Kuakan Alternative 5 Unit Retention

Unit	Silvicultural Harvest Method	Retention Based On:					Estimated Percent of Volume Removed
		Treated Acres	Harvest Acres	Percent of Acres	Trees per Acre	Percent of Volume	
31	Individual/Group Select, retain 65%-75%	225	225	--	--	65-75%	25-35%
32	Individual/Group Select, retain 65%-75%	196	196	--	--	65-75%	25-35%
33	Individual/Group Select, retain 65%-75%	169	169	--	--	65-75%	25-35%
34	Individual/Group Select, retain 65%-75%	260	260	--	--	65-75%	25-35%
35	Individual/Group Select, retain 65%-75%	284	284	--	--	65-75%	25-35%
36	Individual/Group Select, retain 65%-75%	133	133	--	--	65-75%	25-35%
37	Individual/Group Select, retain 65%-75%	78	78	--	--	65-75%	25-35%

Table Silv - 8 Kuakan Alternative 6 Unit Retention

Unit	Silvicultural Harvest Method	Retention Based On:					Estimated Percent of Volume Removed
		Treated Acres	Harvest Acres	Percent of Acres	Trees per Acre	Percent of Volume	
2	Patch Cut in 2-10 acre patches, retain 67%	98	32	67%	--	--	33%
8	Overstory Removal with 15% retention by diameter limit & LTM	28	28	--	15%	--	95%
10a	Patch Cut in 2-10 acre patches & LTM, retain 75%	58	15	75%	--	--	25%
11a	Group Selection, retain 75%	110	28	75%	--	--	25%
12	Overstory Removal with 15% retention by diameter limit & LTM	49	49	--	15%	--	94%
17a	Overstory Removal with 10% retention by diameter limit	66	66	--	10%	--	96%
18	Overstory Removal with 25% retention by diameter limit	52	52	--	25%	--	92%
18a	Clearcut	15	15	--	--	--	100%
19a	Clearcut	10	10	--	--	--	100%
19b	Clearcut	10	10	--	--	--	100%
20a	Overstory Removal with 10% retention by diameter limit	30	30	--	10%	--	96%
24	Patch Cut in 2-10 acre patches & LTM, retain 50%	51	25	50%	--	--	48%
25	Overstory Removal with 25% retention by diameter limit	36	36	--	25%	--	92%
28	Overstory Removal with 10% retention by diameter limit & LTM	30	30	--	10%	--	95%
29	Overstory Removal with 10% retention by diameter limit	35	35	--	10%	--	96%
30	Overstory Removal with 10% retention by diameter limit	14	14	--	10%	--	96%

Logging Systems

Yarding is the process of conveying logs from the stump to the landing. This can be done using ground based, cable or helicopter logging systems. The method used depends upon many factors including access, topography, slope, type of log suspension needed and resource protection needs (for wildlife, visuals, soils and water quality). Cable, helicopter and shovel logging systems could be used for yarding within the Project Area. Shovel yarding would mostly be limited to road right-of-way clearings (see Table Silv-3).

Cable Yarding

Cable yarding systems are the most common logging systems used throughout the Tongass National Forest. Cable systems are best suited for the steep slopes and wet soils of these areas, and most cable systems partially or fully suspend logs over the ground, minimizing soil disturbance. At the present time, running skyline has replaced highlead as the favored cable system when only partial suspension is required.

Helicopter Yarding

Helicopter yarding has been successfully used throughout the Tongass National Forest in recent years. With this system, logs are lifted off the ground (fully suspended) and flown to a landing. This yarding system causes the least amount of ground disturbance of all the yarding systems, and is also the most expensive to operate.

Shovel Yarding

Track mounted log loaders (shovels) have been used throughout the Tongass on a limited base. However, the moist, soft soil conditions in conjunction with steep slopes found within the Project Area prove difficult for operating ground-based yarding equipment. Shovel yarding may be feasible in portions of some cable units. However, the decision to shovel yard will be made by the project Soil Scientist and layout Forester during implementation.

Logging System Damage to Residual Stand

Current timber sale contracts list the minimum diameter of trees to be cut and minimum piece size of logs to be yarded. The minimum piece size (log) that must be yarded has a small end diameter of six inches and a length of 12 feet. Trees smaller than 9 inches at DBH (diameter at breast height measured 4.5 feet above the ground) are not considered merchantable and are not required to be cut, except for safety reasons. Retention within the Kuakan units is not calculated based on these small residual trees. During cable yarding in clearcut units, most of these small residual trees are knocked over. With helicopter yarding these same trees usually remain standing.

Some of larger trees that are designated to be retained in cable and helicopter units can also be damaged during falling and yarding. Blade wash from helicopters during yarding can knock over trees resulting in damage to the remaining trees. Cables and trees that are being yarded can rub against standing trees, creating wounds or breaking branches. Cable units with trees retained throughout the unit require changing yarding rows more frequently than clearcut units, to avoid damaging residual trees.

The Alternatives to Clearcutting timber sale at Hanus Bay studied the residual stand damage resulting from helicopter yarding within harvest units. The harvest unit prescriptions used different treatment methods and varying amounts of retention. This study was based on utilizing varying basal area percentages as retention. As stated previously, the Kuakan action alternatives base their retention on trees per acre, percent of acres, and percent of volume. Table Silv-9 displays preliminary results of the Hanus Bay study (deGayner, June, 1998). The most serious types of tree damage are bole wounds and broken tops. Residual stand damage within helicopter units on the Kuakan sale could be similar to damage experienced at Hanus Bay. The expected damage within the Kuakan units will be within acceptable limits.

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Table Silv - 9 Helicopter Yarding Damage to Residual Stand at Hanus Bay

Treatment (1)	% Retention (2)	% Broken Tops	% Crown Reduction	% Bole Wounding	% Root Wounding
ITS (3)	25	10.2	2.5	11.9	0
Gaps / ITS	25	9.3	21.6	26.8	0
Clumps	25	5.2	7.5	4.0	0.6
ITS	75	3.7	3.9	5.2	0.7
Gaps	75	3.4	4.5	3.4	-
Clumps / ITS	75	4.5	6.7	6.4	1.7
Control	100	0.2	0.2	1.0	0

- (1) ITS - thinning throughout the unit; Gaps - all merchantable trees removed in circular patches (50', 100' and 150' radii); Clumps - same circular patches as Gaps but no trees are harvested; and some treatments combine ITS, Gaps and Clumps
 (2) retention percentages in units measured and marked using basal area
 (3) individual tree selection

Environmental Consequences

Goals and objectives for various land use designations and the application of appropriate standards and guidelines found in the Forest Plan will result in the use of even aged, two-aged (partial cut) and uneven-aged silvicultural systems. Various forms of overstory removal, single tree selection and group selection may be used. Spacial distribution of retained trees will vary between harvest units and alternatives depending on resource objectives, site conditions and logging systems. Proposed harvest units include two acre group selections, patch cuts from two to ten acres, clearcuts, clearcuts with retention, overstory removal of 90% and overstory removal of 25-35%. See the description of alternatives in Chapter 2 for the range of treatments.

Regeneration

All of the areas proposed for timber harvest are expected to be restocked within five years, as required by National Forest Management Act regulations (36 CFR 219.27(c)). Regeneration (stocking) surveys will be conducted on all harvest units after the fourth full growing season following the completion of logging. All harvested areas under all alternatives are expected to be naturally stocked and certified after four full growing seasons. Should portions of harvest units require planting to meet minimum stocking requirements or other resource objectives, plans for planting will be made and a detailed, site-specific prescription will be prepared. Planting would likely be limited to yellow-cedar and Sitka spruce. The majority of natural regeneration will be western hemlock, with western redcedar being more common than either Sitka spruce or yellow-cedar.

Successional Stages and the Desired Future Condition

After reforestation, managed forests grow through several distinctive successional stages in which different components dominate the stand and forest structure changes over time. The majority of harvest areas proposed under the Kuakan Project are expected to have two or more age classes after the initial harvest.

Alternatives 2, 3, 4 and 6 will create predominately young managed stands on the acres where harvest takes place. Alternative 5 may initiate very small amounts of regeneration in small created openings, but the majority of the treated acres will retain their old-growth characteristics with possible increased growth rates on the residual trees.

Silviculture: Direct, Indirect and Cumulative Effects

Alternatives 3, 5 and 6 would tend to lead to more frequent re-entry to Deer Island over time to harvest the total Forest Plan volume modeled from the area over rotation. The Forest Plan modeled a 100 to 150 year rotation for lands in the Modified Landscape Prescription, which is what most of Deer Island is in. Harvest entries into the project area would probably occur every 10-20 years for Alternatives like 3, 5 and 6, based on similar volume entries staged over time. Alternatives 2 and 4 would tend to lead to longer time periods (20-30 years) between entries, if similar volumes were removed each entry over the rotation.

Over the rotation, clearcuts and overstory removal units with 25% or less retention would be entered this first time for a regeneration harvest. Residual trees in these stands would be left as a legacy until the end of the rotation, or possibly be removed during a commercial thinning of the regenerated stand. Patch cuts and group selections would have the unit re-entered 2-4 times during a rotation, to harvest additional patches or groups. These entries would be spaced out over the rotation, with the result being 2-5 distinct age classes developing within the unit. An initial partial harvest entry (such as Alt. 5) would not be considered a regeneration harvest, and we would anticipate very limited natural regeneration. We do anticipate increased growth on residual trees and increases in understory vegetation as a result of opening the canopy. Partial harvest units would have a second entry back into the same unit at approximately 1/3 the rotation age to remove more of the overstory and create enough openings to enhance regeneration under the remaining canopy. A third entry might occur 2/3 into the rotation to remove the remaining overstory and promote growth in the understory. Some legacy of large trees would probably be left, even after the third entry.

All harvest units in all alternatives consist of what are termed for silvicultural purposes "overmature" stands. Harvest will convert the stands to a managed condition. Alternatives 2 and 4 convert the most acres to a managed condition (689 acres), followed by Alternative 6 (475 acres), and Alternative 3 (456 acres). Alternative 5 removes 25-35% from 1345 acres and will manage these units as uneven aged. Alternative 1 proposes no timber harvest and thus converts no stands to a managed condition at this time.

Long-term Timber Productivity (Yield)

All stands proposed for harvest are overmature and well beyond the age of maximum average annual growth of the stand. The average species composition within the Kuakan unit pool is 51% hemlock, 8% Sitka spruce, 21% yellow-cedar and 20% western redcedar. Most stands are representative of uneven-aged western hemlock that commonly take hundreds of years to develop under natural conditions. Harvest increases forest floor temperatures, speeding up organic decomposition and increasing the supply of available nutrients to the trees. The effects of all action alternatives on long-term yield would be the partial conversion of unmanaged, slow-growing, overmature stands to managed, faster growing, multi-aged or two-aged stands.

The open conditions created by even-aged, two-aged and uneven-age systems allow Sitka spruce, western redcedar, yellow-cedar and western hemlock to regenerate rapidly, but tend to favor spruce, the more desirable species for forest products, over hemlock. Based on past experience with even-aged stands, the composition generally includes 10-30% Sitka spruce, 40-70% hemlock and 10-30% cedar depending on the soil type and age of the stand. With the use of precommercial thinning, the percent of hemlock is decreased and cedar and spruce increased usually by an additional 10-20%.

Although log quality in managed stands could be lower than in existing overmature stands, even on sites that have been precommercially thinned, total yield per acre will be higher in managed stands. The lower quality would be reflected in the log grades, with managed timber stands having fewer top grade logs than existing overmature stands. Most managed stands will exhibit less variation in tree diameter and height than the overmature stands they replace. Defect in the new stands is expected to be much less than the existing stands. Mistletoe infestation is not considered significant on Deer Island at this time.

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Post-harvest Silvicultural Treatments

Various post-harvest silvicultural treatments will be prescribed on a site-specific basis to help move the Project Area toward the Forest Plan desired future conditions. Treatments may vary from site to site depending on land use classification, slope, soils, aspect, elevation and resource objectives. Silvicultural treatments planned for areas of prior harvest on Deer Island and harvest units proposed under the Kuakan project include precommercial thinning. Under Alternatives 2 and 3 (units with road access) there is a greater likelihood of commercial thinning, and pruning in the future. Commercial thinning, and pruning however, are not commonly used in the Tongass at the present time, and may not be implemented in the Kuakan Project Area given future economic and/or technology limitations.

Precommercial thinning may occur in the Project Area on sites that have been previously harvested as well as on sites harvested under this project. The 9 acre stand harvested in 1930 could see accelerated growth from thinning, but none is planned at this time. The stands harvested in 1989 and 1990 might be ready for precommercial thinning in 2004 but more likely 2010. The stands proposed to be harvested under the Kuakan project will be ready around 2022. Precommercial thinning reduces the competition for sunlight, moisture, and nutrients for what is often referred to as growing space. This additional growing space results in the understory plants and remaining conifers growing at accelerated rates for longer time periods than unthinned, young even-aged stands. Precommercial thinning can also be used to change species composition and wind firmness of the stand. Sitka spruce, yellow-cedar and western redcedar are usually favored during the thinning process.

It should be recognized that precommercial thinning is performed approximately 20-30 years after harvest and is dependent upon site, stocking, and other resource needs. Due to steep terrain, accessibility, safety considerations, resource protection needs, and budget constraints, some acres will not be thinned.

Precommercial tree thinning and other treatments which manipulate the vegetation can be of benefit not only to timber production but also to wildlife, fisheries, and scenic quality.

**Timber
Management:
Direct, Indirect and
Cumulative Effects**

Timber Resource and Market Demand

A detailed explanation of why we are considering harvesting in the Kuakan Project Area and market demand for wood products is located in Appendix E. For further explanation of the timber resource and market demand refer to TLMP FEIS (part 1, pages 3-248 to 3-307 and part 2, pages 3-445 to 3-452). Other sources of information consulted for this analysis include "Evaluating the Demand for Tongass Timber" (USDA, Kathleen Morse, 1998) and "Tongass Timber Sale Procedures - Setting the FY 2000 Program (USDA, Kathleen Morse, 1999).

Alternative Summary

Differences in the amount of volume and acres harvested illustrate the range of alternatives and how they respond to timber management and harvest economics. Table Silv-10 provides a summary of the Kuakan project area alternatives.

Table Silv - 10 Alternative Summary for the Kuakan Project Area

	Alt. 1 no action	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Available Acres	2688	2745	2745	2745	2513	2513
Harvest Acres (1)	None	689	456	689	1,345	475
% of Available Acres Harvested	None	25%	17%	25%	54%	19%
Volume (MBF) Harvested (1)	None	15,617	10,537	15,005	12,105	10,304
Volume (CCF) Harvested (1,2)	None	31,859	21,495	30,610	24,694	21,020
% of Available Volume Harvested (3)	None	24%	16%	23%	20%	17%

(1) includes road right-of-way

(2) estimated using Region 10 average MBF to CCF conversion ratio (2.04)

(3) based on available acres using an estimated average of 24 MBF per acre

Non-Interchangeable Components (NIC's)

The allowable sale quantity (ASQ) is divided into two non-interchangeable components (NIC) based on economic factors. Detailed NIC information can be found in the 1999 TLMP ROD (pages 42-43); the Forest Plan (pages 4-95 and 7-25 to 7-26); and the Forest Plan FEIS (part 1, pages 3-280 to 3-282). The Forest Plan requires the two NIC volumes to be kept separate for planning and accounting purposes. The Kuakan Project Area contains both NIC I (normal operability) and NIC II (difficult and isolated operability) volume. The NIC volume varies between alternatives due to old growth reserve (OGR) locations and proposed road construction. Building roads on Deer Island would result in reclassification of some NIC II areas to NIC I, which is why Alternatives 2 and 3 reflect harvest of a higher percentage of NIC I acres. Table Silv-11 displays the two NIC volumes harvested by alternative.

Table Silv - 11 Proposed NIC Volume (MBF) Harvested

	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
NIC I	15,617	9,917	13,528	10,602	9,151
NIC II	None	620	1,477	1,503	1,153
Total:	15,617	10,537	15,005	12,105	10,304

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Kuakan Logging Systems

Yarding Methods

Effects to resources resulting from logging systems are discussed in the Soils, Water, Scenery and Wildlife sections of this chapter. Proposed yarding methods for individual units are specified on the Unit Cards (see Appendix A).

One of the most economical logging system currently in use is cable yarding. Alternatives 2 and 3 utilize running skyline and other cable systems to yard a portion of their total harvest (52 and 25 percent). Conversely, the most expensive logging system commonly used is helicopter yarding. All alternatives use helicopters to yard a substantial portion of their total harvest (48 to 100 percent). Shovel yarding will be mostly limited to use along road right-of-way clearings. Harvest acres by yarding system are shown in Table Silv-12.

Table Silv - 12 Proposed Logging System Acreage

Yarding Type	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Running Skyline	274	87	None	None	None
Other Cable	66	28	None	None	None
Helicopter	319	329	689	1345	475
Shovel	30	12	None	None	None
Total:	689	456	689	1345	475

Helicopter Yarding

Many factors greatly influence the economic viability of helicopter yarding. The average yarding distance, wood availability (residual trees, the number of logs per MBF per acre removed), the quality of timber removed, the value of timber removed and turn times are some of these factors. These factors must be considered to achieve the proper combination of payload and turn times to maximize production and lower costs. Meeting helicopter target payloads is important to achieve the best production rate. The percentages of sawlog and utility volume and subsequent value greatly affect economic viability. Utility volume rarely can be yarded economically with either cable or helicopter systems, due to it's low value. For example, the low market scenario used in the economic efficiency analysis estimates the pond log value for utility between \$5 and \$25 per MBF. Using estimates of \$100 per MBF for cable yarding and \$250 per MBF for helicopter yarding, an operator would always lose money when yarding utility wood.

Harvest prescriptions directly impact helicopter yarding costs. Prescriptions that leave residual trees within a unit affect the ability of an operator to reach the proper combination of payload and turn times. The residual trees affect the search time needed to find the timber to be removed, and usually require additional vertical maneuvering by the pilot. It takes more time to maneuver the drop-line in and out of a closed canopy than it does to move directly in and out of a more open unit. For example, using the individual/group selection prescription (Alternative 5) will leave a large amount of residual trees within the units. This will affect the wood availability, search time, canopy remaining over logs, vertical maneuvering and turn times. These factors contribute to higher yarding costs.

Turn time, the amount of time it takes for the helicopter to make a round trip from the landing to the unit and back with a load of logs, plays a key factor in yarding costs. The other side of the economic coin is the value of the timber to be yarded. To generalize, the greater value the timber has that is being removed, the more time the operator can spend on each turn. An operator may be able to go greater distances for logs of higher value, or may be able to search longer if the bulk of the logs to be yarded will bring a higher return at the mill.

Since all action alternatives utilize helicopter yarding, it is useful to compare some of these economic factors between alternatives. Table Silv-13 compares some economic factors that influence helicopter yarding costs between alternatives.

Table Silv - 13 Helicopter Economic Factors

	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Weighted Average Yarding Distance (Feet)	2698	3573	4289	4608	4476
Volume Flown (MBF)	6853	7585	15005	12105	10304
Helicopter Unit Average Net MBF per Acre	21	23	22	9	22

Barge Landings

Barges will be required under any action alternative to minimize impacts to marine resources and to mitigate conflicts with commercial fisherman (see Marine section of this chapter). These barges will be used as landings to facilitate helicopter yarding. Alternatives 2 and 3 will also have volume yarded to the proposed road system. This volume would then be hauled on the road and loaded onto barges at the North LTF (see Appendix D). The estimated amount of volume flown to barges, flown to the Deer Island West LTF (if used), or yarded to the road system and moved through the North LTF is shown in Table Silv-14.

Table Silv - 14 MBF Yarded to Road System and to Barges

Yarding To:	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Barges	1,100	3,964	13,697	10,206	8,569
West LTF	1,308	None	1,308	1,899	1,735
North LTF & Road	13,209	6,573	None	None	None
Total:	15,617	10,537	15,005	12,105	10,304

Transportation System Development

To facilitate logging operations, all action alternatives will allow, at the purchaser's discretion, reconstruction of the Deer Island West Log Transfer Facility. The West LTF could be used as a helicopter landing or as a sortyard to transfer logs from barges to log rafts. Alternatives 2 and 3 also propose to construct a barge-only Log Transfer Facility on the northeast end of Deer Island (see Appendix D). Specified and temporary road construction, and a sort yard are also proposed for Alternatives 2 and 3. Table Silv-15 displays the LTF options, sort yard construction and length of proposed road construction by alternative.

Table Silv - 15 Length of Road Construction and LTF Development

	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Specified Road Miles	6.25	3.10	None	None	None
Specified Road Kilometers (1)	10.06	4.99	None	None	None
Temporary Road Miles	3.11	1.04	None	None	None
Temporary Road Kilometers (1)	5.01	1.67	None	None	None
Sort Yard Construction	Yes	Yes	No	No	No
North LTF Construction	Yes	Yes	No	No	No
Deer Island West LTF Reconstruction	Yes	Yes	Yes	Yes	Yes

(1) based on conversion ratio of 1.61 kilometers per mile

3 Environment and Effects

Economic Efficiency Analysis

Harvest Economics

Current direction in Forest Service Handbook (FSH) 2409.18 requires an economic efficiency analysis to compare benefits and costs of a project. A detailed Harvest Economic Efficiency Analysis was conducted to display a comparison between the action alternatives and is included in the project planning record. The analysis compares expected pond log values against estimated costs and arrives at an estimate of net stumpage values. The harvest economic efficiency of each action alternative is displayed in Table Silv-16. Alternative 1, the no action alternative, is not displayed because there is no harvest associated with it.

The volumes in each alternative includes estimates for sawlog, utility and road right-of-way that would be cut. These volumes are based on stand exam field information and geographic information system (GIS) data. If an action alternative is selected, we would expect the actual cruise volume to vary some from the estimates in the EIS.

High and Low market scenarios are used to estimate each alternatives pond log value, based on its estimated timber quality. Pond log values are closely related to log size, grade, and species composition. The calculated pond log values are based on weighted averages for all sellers of products produced from Tongass National Forest timber sales. These market scenarios are used to display the cyclical nature of timber markets, in essence a "snapshot" in time. They are not intended to display a final appraised stumpage value.

The High market pond log value is the selling value of end products (lumber, pulp, and round log export) minus the manufacturing costs of these products. High market selling values and manufacturing costs are based on data from Forest Service Handbook 2409.22 Interim directive 95-2 (1st Quarter 1995 data).

The Low market pond log value is calculated the same as the High market, except chips replace pulp as an end product. Low market selling values and manufacturing costs are based on data from Forest Service Handbook 2409.22 Interim directive 98-2 (1st Quarter 1998 data).

All costs used in this analysis were current at the time of posting the Notice of Intent for this sale (July 29, 1998). The logging and manufacturing costs are a weighted average figure that represent the costs of an operator of average efficiency.

The difference in net stumpage values between the action alternatives can be attributed to multiple factors including:

- Differences in species composition, volume per acre harvested, and timber quality
- Differences in harvest prescriptions
- Differences in the percentage of cable or helicopter yarding
- The amount of specified and temporary road construction
- Cost differences in barge leasing and slash disposal requirements

Net stumpage values were calculated by subtracting all production costs, profit and risk allowances and specified road costs from the pond log values.

Since both values and costs are weighted averages, they are useful for comparing the economic efficiency of the action alternatives in supplying timber to the regional economy. The results of the analysis are displayed in Table Silv-16. Alternative 1, the no action alternative, is not displayed because there is no harvest associated with it.

Table Silv - 16 Kuakan Timber Values and Costs to an Operator of Average Efficiency

ECONOMIC FACTOR	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Total Volume (MBF) (1)	15617	10537	15005	12105	10304
POND LOG VALUE (\$/MBF)					
"High Market" (2)	615	615	614	640	615
"Low Market" (3)	467	467	474	514	467
COSTS (\$/MBF)					
Stump to Truck (4)	215	281	348	370	348
Transportation (5)	46	47	42	42	42
General Logging Overhead	27	27	27	27	27
Temporary Road Construction	24	12	-	-	-
Specified Road Construction (6)	71	53	-	-	-
"High Market" Profit and Risk (60%)	55	55	54	54	55
"Low Market" Profit and Risk (60%)	41	41	42	44	41
TOTAL COSTS (\$/MBF)					
"High Market"	438	475	471	493	472
"Low Market"	424	461	459	483	458
NET STUMPAGE (\$/MBF)					
"High Market"	177	140	143	147	143
"Low Market"	43	6	15	31	9

(1) includes road right-of-way volume

(2) based on FSH 2409.22-95-2, 1st Quarter 1995 data; lumber, pulp and round log export are end products

(3) based on FSH 2409.22-98-2, 1st Quarter 1998 data; lumber, chips and round log export are end products

(4) includes felling & bucking, yarding, log sort & load and helicopter slash disposal

(5) includes log haul, road maintenance, dump, raft, tow, mobilization, post haul maintenance and barge lease

(6) includes major drainage structures and North LTF costs

Harvest Economic Efficiency Summary

The economic efficiency analysis produced net stumpage values ranging from \$140 per MBF for Alternative 3 to \$177 per MBF for Alternative 2 under a High market scenario. The Low market Net stumpage values range from \$6 per MBF for Alternative 3 to \$43 per MBF for Alternative 2. All alternatives have a positive net stumpage value, which generally indicates economic viability. Alternative 2 is the most economically viable alternative under both market scenarios. This can be attributed to infrastructure development and its reliance on cable logging systems. Alternative 3 is the least economically viable alternative under both market scenarios. A lower amount of volume harvested, combined with costs of both helicopter yarding and infrastructure (road) development contribute to this alternatives lower net stumpage value. Alternative 5 has the highest logging costs of any alternative. However, Alternative 5 targets higher value timber which allows the costs to be offset by the quality of timber removed. Conversely, Alternative 2 has the lowest logging costs of any alternative even though it harvests more low quality timber and has \$95 per MBF in road construction costs.

The range of pond log and net stumpage values between Low and High market scenarios is significant. Alternative 5 has the highest pond log value of all the alternatives. This can be attributed to the low amount of utility volume that would be harvested in this alternative. During the period of time represented by the High market, the selling value of pulp was at a

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Long-term versus Short-term Harvest Economics

high point. Even small sawlogs were being converted to pulp instead of lumber. Since the other alternatives have a higher utility component than Alternative 5, they show a wider range between their High and Low pond log values. However, the higher costs of logging associated with the prescriptions in Alternative 5 offset the increase in pond log value, bring the net stumpage value into the same range as most of the other alternatives. Analysis of the High market scenario shows Alternative 2 remaining the most economically viable alternative, while the other alternatives differ at most by \$7 per MBF.

The projected harvest volume, pond log values, costs and net stumpage values are estimates and not definitive figures. These estimates are useful for comparing the alternatives but not for determining actual volume, costs and values. If any action alternative is selected all merchantable timber within units and road right-of-way clearing will be cruised to determine the quantity, quality and value of timber. The final Kuakan appraisal will include current quarter selling values, current cost information and a normal profit and risk allowance to determine the minimum advertized stumpage value. Competitive bidding will determine the actual value.

Economic Benefits Over Time

Short-term economics of harvest are different than long-term economics of a sustained harvest level. Selecting the most economically efficient alternative for the immediate future may not provide the greatest efficiency over time. Even though this project may be considered a short-term decision, it should be responsive to long-term needs and issues. There are some costs associated with resource management that are considered fixed costs that are incurred each time a project is undertaken. These include things like the costs of environmental analysis, contract preparation and contractor start-up and shut-down costs. A heavier harvest level with less frequent entries over a rotation (Alts. 2 and 4) incurs less costs over time than a lighter harvest level with more frequent entries (Alts. 3, 5 and 6).

The economic trade-offs between alternatives of this entry must be weighed against the cost and value of the transportation system (roads, logging system and log transfer facilities) and how they affect future economic efficiency. Alternatives 2 and 3 represent two different levels of development of the transportation system. Alternatives 4, 5 and 6 propose no transportation system development.

Of the roaded options, Alternative 3 builds the least amount of road infrastructure and relies primarily on helicopter yarding this entry. Since Alternative 3 builds the least amount of road, it does not provide as much access for future harvest entries. It also harvests normally operable cable acres with a helicopter along the south road corridor. Therefore, extension of the road system to the south would be unlikely in future harvest entries under this alternative. Alternative 2 builds most of the road infrastructure on this first entry and utilizes cable logging systems in more units. This alternative accesses the highest percentage of operable cable acres in the project area, enabling the road costs to be amortized over multiple entries.

Alternatives 4, 5 and 6 defer transportation system development this entry. Several design factors of these alternatives would also limit consideration of future transportation system development. Alternatives 5 and 6 relocate the old growth reserve (OGR) to the North end of Deer Island. Since the only viable log transfer facility location and subsequent road heading would be within the old growth reserve, future construction of the LTF and road system is highly unlikely to occur. Alternatives 4, 5 and 6 also harvest a portion of the operable cable acres with a helicopter. These are acres that could normally be harvested by cable logging if a road system were in place. Relocation of the old growth reserve and helicopter harvest on normally operable cable acres tend to commit all future harvest entries to utilize helicopter logging systems and not develop a transportation system.

Differences in the amount of transportation infrastructure built for this entry and the harvest system used illustrates the range of alternatives and how they respond to both short-term as well as long-term harvest economics.

Socioeconomics

Affected Environment

Socioeconomic Setting

The purpose of this section is to analyze pertinent project specific socioeconomic factors. For detailed socioeconomic analysis refer to the Forest Plan FEIS (part 2), pages 3-431 to 3-685 and Appendix H of the Forest Plan (USDA Forest Service, 1997b).

The Kuakan Project Area includes all of Deer Island and the surrounding smaller islands, including the Niblack Islands to the west of Deer Island. It is readily accessible by boat and airplane from communities on Prince of Wales Island, Wrangell Island, and the community of Meyers Chuck. TLMP survey information shows that the principal users are from Coffman Cove and Meyers Chuck (TLMP FEIS (part 2), pages 3-529 to 3-680). Other principal users include residents of Wrangell Island, particularly Thoms Place residents (based on public comments). Community use of the area for recreation, fishing, and subsistence is discussed in the Recreation, Scenery, and Subsistence sections of this chapter.

The communities surrounding the Project Area have economies that would be directly or indirectly impacted by any alternative. The community of Wrangell would likely see the largest economic impacts from any action alternative. The City of Wrangell and its residents would benefit from increased employment opportunities and the Twenty-Five Percent Fund Act of 1908 under the action alternatives.

Environmental Consequences

Employment and Income Effects

Contributions to Regional Employment

The action alternatives would generate or maintain employment and income in Southeast Alaska as a result of timber harvest. Employment would be both directly and indirectly related to timber harvest activities. Direct employment refers to logging and milling jobs. Indirect employment refers to businesses supporting the woods product industry. To estimate the employment levels likely to result from the action alternatives, a conversion of board feet to jobs is used. Based on data from Tables A-1 and A-5 in Timber Supply and Demand 1996, (USDA Forest Service, 1996) the estimate is 6.42 jobs per million board feet (3.72 direct and 2.70 indirect jobs). The data compares annual volume harvested and annual employment levels between 1990 and 1996. An example would be if a 10 MMBF sale was sold 64.2 jobs would be supported from that sale. Table SE-1 shows employment estimates based on the amount of volume removed for each alternative. Implementation of Alternative 1 (no action) would not generate or maintain Direct and Indirect employment opportunities within the region. As would be expected, the higher the harvest, the more jobs and income that result.

Table SE - 1 Kuakan Contributions to Regional Employment

Type of Jobs	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Direct	0	58	39	56	45	38
Indirect	0	42	29	40	33	28
Total:	0	100	68	96	78	66

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Payments to the State of Alaska

As part of the Twenty-Five Percent Fund Act of 1908 and subsequent amendments to the Act in 1976, 25 percent of gross National Forest receipts from net stumpage are returned to the State in which the National Forest is situated, for the benefit of public schools and public roads. The State of Alaska distributes the funds to organized boroughs and municipalities. Table SE-2 displays the estimated payments to the State of Alaska and the proportion going to the City of Wrangell (based on average distribution from the State between 1994 and 1998) for each alternative. These figures represent the **minimum payment** and an **estimated payment** based on the advertised value under the "High Market" scenario from Table Silv-16. These figures do not account for any potential competitive bid premium stumpage value above Base or higher Advertized Rates. Any bid premium would result in increased payments to the State of Alaska and subsequently to the City of Wrangell for the benefit of public schools and public roads. Under Alternative 1 (No Action) local communities like Wrangell would not benefit from Twenty-Five Percent Fund Act receipts associated with the action alternatives.

Table SE - 2 Kuakan Minimum and Estimated Payments to the State of Alaska

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Volume (mbf)	None	15617	10537	15005	12105	10304
Minimum Base Rate Value /mbf (1)	\$0.00	\$9.75	\$9.75	\$9.75	\$9.75	\$9.75
High Market Advertized Value /mbf	\$0.00	\$177.00	\$140.00	\$143.00	\$147.00	\$143.00
Base Rate Less \$0.50/mbf to Treasury (2)	\$0.00	\$9.25	\$9.25	\$9.25	\$9.25	\$9.25
High Market Less \$0.50/mbf to Treasury (2)	\$0.00	\$176.50	\$139.50	\$142.50	\$146.50	\$142.50
Base Rate Multiplied by mbf (3)	\$0.00	\$144,457	\$97,467	\$138,796	\$111,971	\$95,312
High Market Multiplied by mbf (3)	\$0.00	\$2,756,401	\$1,469,912	\$2,138,213	\$1,773,383	\$1,468,320
Base Rate 25% to State	\$0.00	\$36,114	\$24,367	\$34,699	\$27,993	\$23,828
High Market 25% to State	\$0.00	\$689,100	\$367,478	\$534,553	\$443,346	\$367,080
Base Rate 7.12% to Wrangell (4)	\$0.00	\$2,571	\$1,735	\$2,471	\$1,993	\$1,697
High Market 7.12% to Wrangell (4)	\$0.00	\$49,064	\$26,164	\$38,060	\$31,566	\$26,136

(1) Minimum Base Rate Value is the lowest stumpage value, CFR 223.61

(2) \$0.50/mbf is the minimum payment to the U.S. Treasury

(3) 25% Fund Act payments (25% of net stumpage value) to the State of Alaska.

(4) 7.12% is Wrangell's average portion of the 25% Fund Act payments from the Tongass National Forest to the State of Alaska for Federal fiscal years 1994-1998.

Information source: Bill Rolfzon, State of Alaska Department of Community & Regional Affairs.

Public Investment Analysis

Public investment analysis of each alternative uses net stumpage values from Table Silv-16. The average Region 10 Budget Allocation costs and management expenses are subtracted from net stumpage revenues to determine net value. The costs and management expenses include NEPA planning, sale preparation, harvest administration and engineering support. The estimated costs and net value of each alternative are displayed in Table SE-3.

Table SE - 3 Kuakan Public Investment Analysis

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Volume (mbf)	0	15617	10537	15005	12105	10304
"High Market" Net Stumpage Value per mbf (1)	\$0.00	\$177	\$140	\$143	\$147	\$143
"Low Market" Net Stumpage Value per mbf (1)	\$0.00	\$43	\$6	\$15	\$31	\$9
"High Market" Stumpage Value	\$0.00	\$2,764,209	\$1,475,180	\$2,145,715	\$1,779,435	\$1,473,472
"Low Market" Stumpage Value	\$0.00	\$671,531	\$63,222	\$225,075	\$375,255	\$92,736
Costs (2)						
NEPA (3)	\$697,000	\$697,000	\$697,000	\$697,000	\$697,000	\$697,000
Sale Preparation (4)	\$0.00	\$359,191	\$242,351	\$345,115	\$677,880	\$236,992
Sale Administration (4)	\$0.00	\$140,553	\$94,833	\$135,045	\$108,945	\$92,736
Engineering Support	\$0.00	\$437,276	\$295,036	\$0.00	\$0.00	\$0.00
Total Costs	\$697,000	\$1,634,020	\$1,329,220	\$1,177,160	\$1,483,825	\$1,026,728
"High Market" Net Value	(\$697,000)	\$1,130,189	\$145,960	\$968,555	\$295,610	\$446,744
"Low Market" Net Value	(\$697,000)	(\$962,489)	(\$1,265,998)	(\$952,085)	(\$1,108,570)	(\$933,992)

(1) Net stumpage value/mbf from Table Silv-16

(2) Forest Service costs/mbf based on the Region 10 average budget allocation of \$41/mbf for NEPA, \$23/mbf Sale Prep, \$9/mbf Sale Administration and \$28/mbf Engineering Support.

(3) NEPA cost based on 17 mmbf (Notice of Intent volume). There is one cost to conduct the environmental analysis.

(4) Sale preparation cost of \$56/mbf for alternative 5 is an increase above the regional average. These additional dollars are needed for field preparation due to the management approach of this alternative.

Analysis of the "High Market" indicates that all the action alternatives would generate a monetary return to the public, ranging from \$145,960 for Alternative 3 to \$1,130,189 for Alternative 2. However, timber markets are cyclical by nature and net value could increase or decrease (see "Low Market" net value) for all action alternatives. The range in net value directly correlates to volume harvested and the costs to implement, prepare and administer these alternatives. Alternative 1 provides a negative monetary return to the public, under both market scenarios. This is due to the NEPA investment of \$697,000 with no stumpage returns to the public. The net revenues from Alternatives 2 and 3 are expected to be less than the returns from future harvest entries that could use the road system constructed with these alternatives. This conclusion is based on the assumption that the road costs incurred during this entry will provide infrastructure improvements to support future timber harvests. Sale preparation costs for Alternative 5 are higher than any other alternative. This is due to the intensive field work that would be needed to implement this alternative.

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Summary

Economic Factors Summary

A review of the alternatives indicates Alternative 2 would produce the highest number of jobs, the largest payment to the state, and the highest potential public investment return.

Table SE-4 summarizes the analyzed socioeconomic impacts of each alternative.

Table SE - 4 Kuakan Socioeconomic Summary

Economic Factor	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Number of Jobs Produced	0	100	68	96	78	66
Minimal Payment to State (1)	\$0.00	\$36,114	\$24,367	\$34,699	\$27,993	\$23,828
Public Investment Return (2)	(\$697,000)	\$1,130,189	\$145,960	\$968,555	\$295,610	\$446,744

(1) Based on a "Base Rate" scenario, Table SE-2.

(2) Based on a "High Market" scenario, Table SE-3.

Civil Rights Impact Analysis

A Civil Rights Impact Analysis (CRIA) is included as part of this Final EIS. The purpose of the CRIA is to identify any possible impacts associated with this proposed project based on an individuals civil rights (race, color, national origin, age, religion, gender, disability, political beliefs, sexual orientation, marital or family status). We have no indication, nor have any comments been received, that would lead us to believe that any of the alternatives considered for the proposed project would impact any individual's civil rights. This analysis tiers to the Economic and Social Environment Analysis included in Chapter 3 of the Forest Plan FEIS (USDA Forest Service, 1997b).

Soils

Affected Environment

Geology

Deer Island lies in the Gravina geologic belt as described by Brew, 1997. Two geologic units cover most of the island: the Hornfelsed Seymour Canal formation rocks of Miocene and/or Oligocene age and a massive Migmatic granitic rock type. The Hornfelsed units are metasedimentary rock, found on the north and south end of the island. The massive granitic rocks are located in the center of the island. Numerous small rock types are mapped west of Deer Island on Cucumber Island and the other small islands.

Soils

A Forest-wide treatment of soils may be found in the Forest Plan FEIS, Chapter 3. Applicable soils direction is included in the Forest Plan, Chapter 4 and Appendix C. The unit and road cards (Appendices A and B) of this document contain additional site-specific implementation requirements.

The soils on Deer Island are typical of those found throughout Southeast Alaska. Forest soils are predominantly formed in colluvial material or over residual bedrock; glacial till was rarely encountered. Deep silty textured soils were found on the east side of the island. In general, soils were found to have a fairly high silt content, possibly due to loess deposition in the past. Most forest soils are topped with a thick organic layer which makes them resistant to surface erosion unless disturbed. When the organic layer is disturbed or removed, the underlying mineral soils are easily subject to erosion.

Naturally occurring landslides are common on Deer Island in areas with steep slopes. Adjacent areas with similar conditions are considered unstable. Soil maps, on file at Wrangell Ranger District, depict soil mass movement hazard classes. Tree roots contribute to slope stability on oversteepened slopes. Harvesting trees can decrease the "resistance to failure" factor. During road construction, the additional weight of equipment on hillslopes with marginal stability can result in hillslope failure. Blasting can also induce mass failure by "shaking" the hillslope, especially in areas with poorly drained soils and when soils are saturated by rainfall.

Soil Development

The high amount of precipitation and cool temperatures of the region results in the accumulation of a high amount of organic material. Mineral soils formed in these conditions are typically subject to podzol development. Podzolized soils are characterized by high acidity, poor drainage, and low timber productivity. Ultimately, podzols may lead to the formation of bogs or muskegs from sites that previously supported forests. Scientific evidence (B.T. Bormann et. al., 1995) is showing that some soils in southeast Alaska depend on periodic mixing of the organic layers and the deep mineral soil to prevent or correct podzol formation. Windthrow may have important ecological benefits by breaking up the podzol layers and bringing mineral soil to the surface.

Soil Productivity

Soil productivity is primarily a function of soil drainage and soil depth. Most of the soil nutrient capital is in the upper soil horizons (8-15 inches). Soil disturbance from logging can have a detrimental impact on soil productivity. Dragging logs across areas can physically displace the soil from the logging corridor. Disturbing the surface layers can remove nutrient capital, and by removing the surface organic layer, can make the soil more susceptible to erosion. Large-scale clearcutting can increase the susceptibility of

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slopes 34 degrees (68%), or steeper, to mass failure and subsequent loss of soil productivity. This is because tree roots are a factor contributing to slope stability, and when the roots decay this stability factor is reduced.

Retention of windfirm scattered green trees in harvest units is expected to increase the rooting strength factor in the slope stability equation. On slopes steeper than 60% windthrow can cause detrimental disturbance because the exposed soil will erode. This is a concern in units where residual trees are left adjacent to incised streams. Windthrow occurrence may also contribute to landslide initiation on over-steepened slopes.

Environmental Consequences

Conversion of land to roads and rock pits removes these sites from productivity. Soil disturbance to areas over 100 square feet is usually considered detrimental. These measures are displayed for each alternative in Table Soils-1. For roads, a 4.8 acre disturbance per mile of road is assumed, based on a 40 foot average clearing width. For rock pits, a 2 acre disturbance is assumed for every 2 miles of road constructed. For cable logging, 1/10 acre of disturbance is expected per 100 acres of cable yarding. Regional Soil Quality Standards consider roads and rock pits as a land allocation, not detrimental disturbance, thus this analysis may "overstate" impacts. No detrimental soil disturbance is expected from helicopter yarding.

Table Soils-1
Potential Amount of Detrimental Soil Disturbance for each Alternative (acres).

Factor	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Roads	0	44.9	19.9	0	0	0
Rock pits	0	9.36	4.14	0	0	0
Logging disturbance	0	34	12	0	0	0

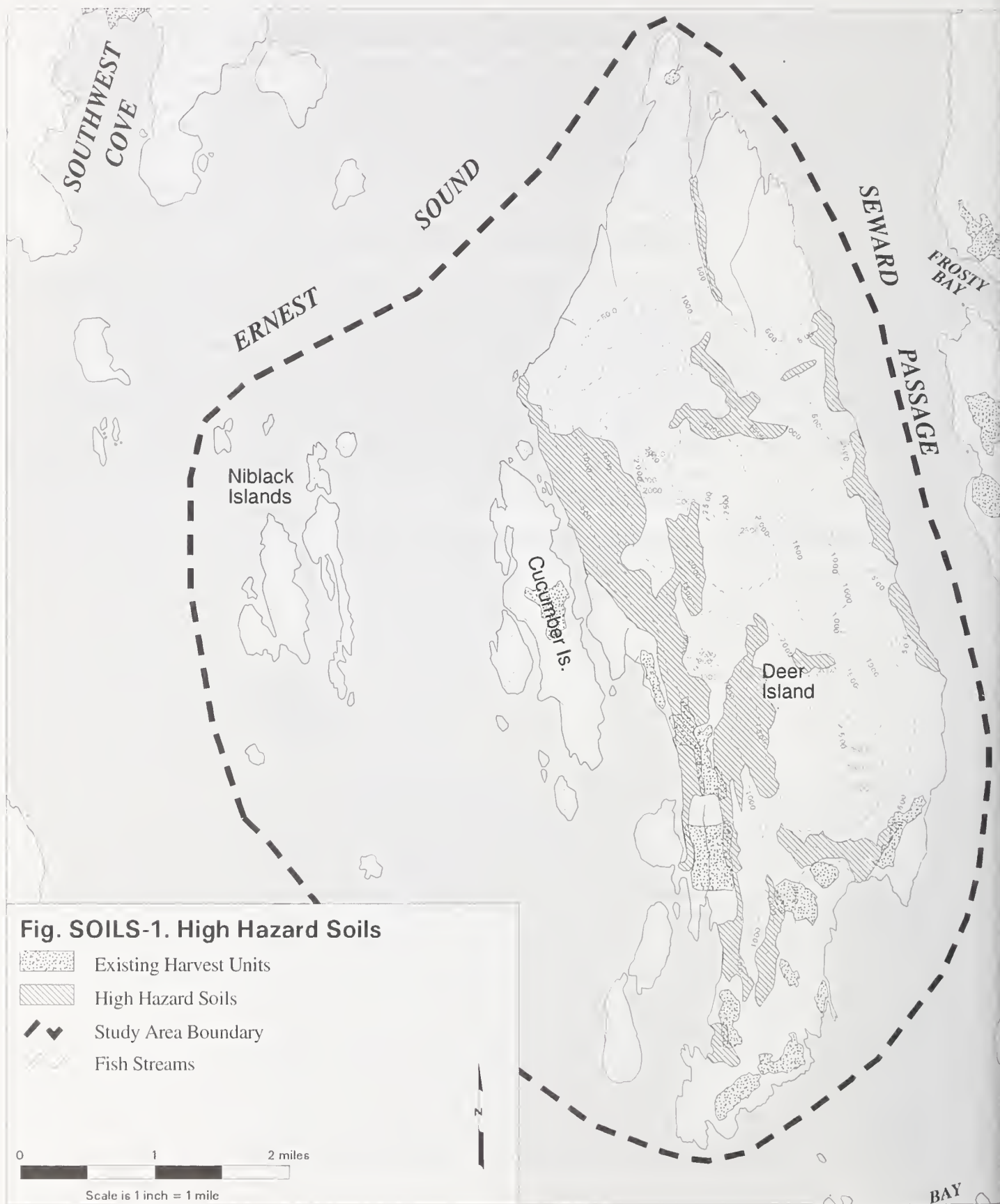
Harvest on over-steepened slopes (72 % or greater) is generally avoided, as these lands are considered unsuitable for timber management. Figure Soils-1 shows the location of areas with a mass movement index of "high hazard". These are generally areas with slopes >75%. Some harvest may occur in areas with slopes over 72%. The unit cards in Appendix A and the mitigation table in Appendix G identify which units potentially include harvest on oversteepened slopes. Our GIS database indicates the following units may contain slopes in excess of 72 percent; 1, 3, 4a, 18a, 19a, 25, 33, 35, and 36. In unit 1, groups will be placed to avoid harvest on slopes >72%. In units 3, 4a, 18a, 19a, 25, and 35 the boundary will be laid out to avoid harvest on slopes >72%. Helicopter harvest retaining 75% of the stand may occur on slopes >72% in units 33 and 36. Helicopter harvest retaining 65-75% of the volume is expected to have minimal effect on slope stability. Slopes >72% adjacent to stream buffers will not be harvested. Mitigation measures proposed for harvest on slopes steeper than 72% include unit modification, and retention of windfirm residual trees to maintain slope stability. No loss of soil productivity is expected due to mass movement associated with slope failure.

In addition to the amount of disturbance displayed in Table SOILS-1, Alternative 2 has the potential to cause increased disturbance. Due to topographical constraints, it is necessary to locate a proposed road across a 70% hillslope with an old landslide tract. Even with

controlled blasting and end-haul construction techniques, there is concern about the stability of the road in the area of the switchbacks (figure Trans-1). There is a high risk of potential slope failures that can occur during right-of-way drilling and blasting and high risk of cutslope instability. Soils are poorly drained in this area, with the presence of saturated organics on the surface. These sites are prime candidates for liquefaction failure during blasting. A slope failure has the potential to run downslope a long distance incorporating adjacent loose slope materials in the process. The deposition, if failure occurs, would be on the bench just below the lowermost steep section creating a long landslide scar. Construction of a retaining wall will decrease the amount of surface erosion and improve success of erosion control revegetation. See the Transportation section in Chapter 3 for more discussion of the switchbacks. This road location is only included in Alternative 2.

Not all soil disturbance is detrimental. Mixing of organic material with mineral soil often enhances site productivity. Gardeners often mix organic material (mulch) into their mineral soil to enrich the soil. In the same manner, some churning of the mineral soil in the forest helps to mix organic material into the soil over time, thus enriching the site. This mixing happens naturally through windthrow, where trees are tipped over and roots are pulled up with a large ball of soil clinging to them. Organic material (leaves, needles, twigs, etc.) is deposited in the hole that was created, and the soil on the roots falls on top of the organic layer, resulting in a mixing of the organic and mineral layers of the forest floor. Retaining some residual trees in most harvest units may result in some soil churning as a product of individual trees blowing down over time. This may be an important factor contributing to soil productivity.

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Subsistence

This section summarizes the results of the subsistence 810 evaluation for Deer Island. Additional information can be found in the Wildlife section of this document.

Affected Environment

The Alaska National Interest Lands Conservation Act (ANILCA, 16 USC 3113) provides the definition of and the authority to manage resources for subsistence uses. ANILCA defines subsistence uses as: "The customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of nonedible by-products of fish and wildlife resources taken for personal or family consumption; and for customary trade."

Congress declared that "the continuation of the opportunity for subsistence uses by rural residents of Alaska, including both Natives and non-Natives, on the public lands and by Alaska Natives on Native lands is essential to Native physical, economic, traditional, and cultural existence and to non-Native physical, economic, traditional, and social existence". It also stated, in part, under Section 804: "Except as otherwise provided in this act and other Federal laws, the taking on public lands of fish and wildlife for nonwasteful subsistence uses shall be accorded priority over the taking on such lands of fish and wildlife for other purposes."

Originally under ANILCA, the State of Alaska continued to manage the use of fish and wildlife as long as it enacted subsistence laws consistent with the Act. However, a series of lawsuits and court rulings revealed a conflict between the State Constitution and ANILCA with respect to rural preference for subsistence uses. Thus, on July 1, 1990, the Federal government assumed subsistence management of wildlife on Federal public lands. The Federal Subsistence Board is the governing body charged with the responsibility for regulation and allocation of subsistence uses on Federal public lands. For a more thorough discussion of the history of the subsistence issue see the FEIS for Subsistence Management for Federal Public Lands in Alaska (USDI 1992).

Communities With Subsistence Uses Within The Project Area

In attempting to identify the communities that use the Deer Island sale area, a wide range of information was consulted including the data and reports from the 1987 Tongass Resource Use Cooperative Study (TRUCS) survey and mapping effort, the Forest Plan (1997), and recent ADF&G harvest and subsistence information. Based on this information the following communities have documented use of the project area for subsistence purposes: Hydaburg, Petersburg, Saxman, Thorne Bay, Meyers Chuck, Port Protection and Wrangell. Documented use by Wrangell includes Thom's Place which is in close proximity to Deer Island. Thom's Place residents expressed concern about the impacts of timber harvesting on subsistence. All communities have been determined to be rural by the Federal Subsistence Board. Wrangell is the only community which meets the criteria for inclusion in an 810 analysis based on the importance of deer as a subsistence resource to the community, harvest of marine resources, historical use and access (Kruse 1993).

Important Subsistence Use Zones in the Project Area

Information on important use areas was obtained by looking at maps generated with the TRUCS database. The west side and north end of Deer Island appear to be areas that are important to Deer Island deer hunters. The north end is the only area listed as important to marine mammal hunters. Fishing for halibut and other finfish takes place largely on the west

and north end of Deer Island (Ernest Sound). Use by salmon fishermen encompasses these same areas and extends into Seward Passage. There are no subsistence crabbing or shrimping areas identified by TRUCS.

Community Subsistence Profile

The majority of Wrangell households hunt deer in Wildlife Analysis Areas (WAAs) 1903, 1904 and 1905 (Wrangell, Woronkofski/Vank, Zarembo). Deer harvest within the project area has been sporadic and low. Hunters have attempted to harvest deer in the project area most years but have been unsuccessful (Tom Paul, pers. comm.). Deer harvest on Deer Island makes up less than 1% of the total deer harvest by Wrangell residents. Three to four households in Wrangell listed Deer Island as their most reliable spot for hunting deer (most likely Thom's Place residents). Four to sixteen households list Deer Island as an area where they have hunted deer. No furbearer or black bear harvest has been reported by Wrangell residents within the project area in recent years (Tom Paul, pers. comm.). Only one household reported use of Deer Island for the harvest of marine mammals.

Environmental Consequences

ANILCA Section 810 Subsistence Evaluation Process

Section 810 of ANILCA requires a Federal agency, having jurisdiction over public lands in Alaska, to analyze the potential effects of proposed land-use activities on subsistence uses and needs. An ANILCA 810 analysis should include: an evaluation of the possibility of effects on subsistence uses; a distinct finding on whether the proposed activity may significantly restrict subsistence uses; notices and hearings if the evaluation results in a finding that the proposed activity may significantly restrict subsistence uses; and determinations if, following a public hearing a finding of a significant restriction remains, the responsible official decides to proceed with the proposed project.

Evaluation criteria used to assess the effects of the proposed alternatives are: (1) changes in abundance or distribution of subsistence resources, (2) supply and demand, (3) changes in access to subsistence resources, and (4) changes in competition from nonsubsistence users for those resources. The evaluation determines whether subsistence uses within the analysis area or portions of the area may be significantly restricted by any of the proposed alternatives. To determine this, the evaluation: (1) considers the availability of resources used for subsistence in the surrounding areas; (2) considers the cumulative impacts of past and reasonably foreseeable future activities on subsistence users and resources; and (3) focuses on the mapped subsistence use areas by communities with documented subsistence use within the study area.

Wildlife, fish, shellfish, marine mammals, other foods, and timber are the resources used for subsistence that are evaluated in the 810 analysis. The results of the evaluation are expressed in the Findings. The Findings state whether there is or is not "a significant restriction" on subsistence uses. The Alaska Land Use Council's definition of "significantly restrict subsistence use" is one guideline used in the evaluation. By this definition:

"A proposed action shall be considered to significantly restrict subsistence uses, if after any modification warranted by consideration of alternatives, conditions, or stipulations, it can be expected to result in a substantial reduction in the opportunity to continue uses of renewable resources. Reductions in the opportunity to continue subsistence uses generally are caused by: reductions in abundance of, or major redistribution of resources; substantial interference with access; or major increases in the use of those resources by non-rural residents. The responsible line officer must be sensitive to localized, individual restrictions created by any action and make a decision after reasonable analysis of the information available."

A Finding of no significant restriction completes the Section 810 requirements. A Finding of "may cause a significant restriction" requires that (1) the proposed action be modified to remove the significant restriction, or (2) the proposed action be dropped, or (3) proceed with the notice and hearings.

Subsistence use of bear, furbearers and waterfowl is minimal and not discussed in this section. Detail on the use of these species is documented in the 810 analysis. Additional information on deer populations is included in the Wildlife section of this document.

Abundance and distribution of deer

Subsistence demand for deer was estimated by using the average harvest from 1987-1997 and assuming a 15% increase per decade. Seventeen deer have been reported as being harvested in the WAA during this time which equates to an average of 2 deer per year. All deer were harvested by rural residents. In the year 2040 demand is predicted to be 4 deer which would require a population of 40 deer (assuming a 10% harvest rate). In the ADF&G Strategic Management Plan for deer (1991a) it states that hunter use and harvest are sporadic on Deer Island probably because of low deer populations.

Habitat within the Deer Island VCU is capable of supporting 490 deer under current conditions based on the current deer model. Under all alternatives, remaining habitat is able to support more than 350 deer, far above the required population of 20 - 40 deer (see Wildlife section, Table Wildlife-3). Due to the acres of land considered unsuitable for timber harvesting, habitat capability will support a population of at least 25 deer/square mile in the year 2095. A Habitat Capability of 18 deer/square mile is recommended to support both wolves and a huntable deer population (ADF&G letter on file).

Several changing variables make it difficult to predict the effects of this timber sale on actual deer densities. Although deer winter habitat loss will occur with this timber sale, many important areas are protected under the Forest Plan. Based on our models, nearly all high value habitat is protected within beach, estuary and stream buffers (Forest Plan 1997 and Table Wildlife-2). We saw a lot of deer use in existing second-growth stands that were not yet in the stem exclusion stage. If winters continue to be mild, additional timber harvesting may provide new forage for deer. However, with a hard winter, deer will be relying on closed canopy stands for forage. Based on the amount of valuable winter habitat that will remain, the new forage provided within harvest units and the low level of hunter demand, there should not be a significant restriction to deer harvest as a result of the Kuakan timber sale.

Access to wildlife

Access to historical subsistence use areas would not be restricted by any project alternative but roads may lead to increased use. Access to the study area will continue to be by traditional means, primarily personal boats. The Alaska Marine Highway System does not serve the study area or any roads that access the study area and is not expected to do so in the foreseeable future. There are two anchorages on the west side of Deer Island that could be affected by sale activities, with placement of log-landing barges or a temporary floating camp. Increased access to foot traffic may increase the deer, bear and marten harvest on the island but current demand (based on past harvest levels) is low. Although there may be some long term changes in access, we do not expect that the increased access would reduce subsistence harvests below historic levels.

Competition for wildlife

Competition would be expected to temporarily increase during actual timber harvest activities. It is assumed that some percentage of the timber harvest work force would be eligible for subsistence harvest. Others could hunt under nonsubsistence regulations. The actual level of competition would depend on the timing of activities in the area, the length of activities, and the size of the work force. Following completion of sale activities, no additional competition would be expected because of the relative isolation of the area from population centers. The Forest Plan (1997) lists competition as a significant factor affecting

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subsistence in the future for Chichagof, Baranof and Prince of Wales but does not mention Deer Island.

A substantial increase in competition for subsistence wildlife resources from non-rural community residents is not projected to result from the alternatives proposed. Nor is competition for those wildlife resources projected to increase in the foreseeable future due to activities proposed in this project. This is because the opportunity for easy and economical access to the study area by non-rural residents and out-of-state hunters is assumed to remain limited during the life of the proposed project. There are no known connections between an increase in nonresident wildlife harvest and land management activities.

Abundance and distribution of salmon, finfish, shellfish

The present abundance and distribution of shellfish is assumed to be primarily affected by commercial harvest and natural processes. Our analysis indicates that some, although not quantified, effects on habitat for crabs, clams, and other shellfish would occur due to LTF construction. The effect on the abundance and distribution of local crabs, clams, and other shellfish is likely to be negligible. The project effects from this temporary LTF are also projected to be negligible.

Access to salmon, finfish and shellfish

Access to historic subsistence use areas is not projected to be affected by any of the proposed activities or development. Nor is there a significant possibility it would be affected in the foreseeable future because of the proposed activities related to this development. This determination is made because access to traditional subsistence use areas by boat and foot would remain unchanged. There could be improved access via roads to reaches of streams that were not previously recorded as being used for the harvest of salmon. The ability to catch fish in near-shore waters of the study area could be affected by limbs and other debris resulting from helicopter logging and log rafts. Such debris could become entangled in fishing lines and nets, resulting in the loss of fish and gear. Monitoring during operations will minimize the amount of debris escaping, so we do not expect losses of gear and fish to cause a substantial reduction in subsistence harvests.

Competition for salmon, finfish and shellfish

The area is currently used by commercial finfish and shellfish harvesters. The proposed action should not increase commercial uses. As similarly discussed concerning competition for wildlife, there may also be some increased competition for subsistence fisheries resources from timber sale operations nonresident and Alaska non-rural resident employees. However, this increase is not expected to be substantial, due to the small number of people involved, seasonal nature of activities, and the limited time frame of activities. Following sale operations, no additional competition for fish and shellfish resources would be expected.

Floating camps were used during logging operations at Deer Island, Frosty Bay and Campbell. The Deer Island camp, which housed about 25 people, was anchored in the southwest cove of Deer Island from July 1989 through May of 1990. The Frosty Bay camp, which housed about 55 people, was anchored in Frosty Bay from November 1992 through November 1993. The Campbell camp, which housed about 35 people, was anchored in the Bradfield Canal from June 1995 through November 1995. (See Table Subsistence-1).

Table Subsistence-1
Logging Camp Use

Timber Sale	Volume (MMBF)	Camp location	Camp use dates	Camp size (people)	Type of sale	Planned Sale Life	Length of Activity
Deer Island	14.8	Southwest Deer Island	July '89-May '90	25	Helicopter	5 years	1 year
Frosty Bay	40.1	Frosty Bay	Nov '92-Nov '93	50-60	Helicopter & Cable	5 years	1 year
Campbell	15	North Shore of Bradfield Canal	June '95-Nov '95	35	Helicopter	5 years	7 months
Kuakan	10-15	Southwest Deer Island or Frosty Bay	1-2 seasons probable	25-35	Helicopter	5 years	

Based on past use, we would anticipate a 25 to 35 person floating camp would be used, and it is highly likely the sale would be completed in one year. While it is likely that the people staying in the camp would participate in subsistence or sport fishing, we have no indications that their use would significantly affect existing subsistence, sport or commercial fisheries.

Marine mammals evaluation

Harbor seals are the only marine mammal in the study area available for subsistence harvest. The abundance and population trends of seals in the Deer Island area are unknown. Seals were occasionally seen in the area during field reconnaissance. The most likely area for human/marine mammal interface would be at the estuary on the north end because seal are often seen near the mouths of anadromous fish streams. Currently, there is no evidence to suggest that timber harvest and related development activities have a significant impact on the abundance of marine mammals. The proposed developments and activities associated with this project would have no effect on access or competition to marine mammals.

Plants and timber evaluation

Other foods used for subsistence include plants such as kelp, goose tongue, and a variety of berries, etc. Though other foods did not constitute a major portion of the 1987 subsistence harvest by the rural communities documented in TRUCS, they are considered subsistence resources.

A number of the cedar trees within the beach fringe have been "modified". Cedar bark is used for art, construction and for spiritual reasons and some residents have indicated that this is an important island for cedar collection. The Deer Island timber harvest will not significantly impact these users since the 1000' beach fringe contains the majority of the use.

Most traditional gathering of other foods occurs near beach and estuarine areas. With the exception for the log transfer facilities no activities proposed in the alternatives would infringe upon the beach and estuarine areas. The proposed timber harvest activity would improve the availability of berries in the units in the short-term but availability would likely decrease in the long-term. No significant affect on distribution of other foods resources is expected.

Access to harvest of beach greens and seaweed/kelp would not be affected by proposed activities except in the immediate vicinity of LTFs. Access to berries would likely be improved in roaded alternatives. However, other foods are typically gathered close to town (Cohen 1989). Thus, no significant affects on access to other foods are expected due to the

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proposed action or within the foreseeable future. Based on the distance of the study area from population centers, it is unlikely that there will be any competition for these resources.

The Forest Service free-use policies in Alaska for firewood and timber remain unchanged. Since 1993, 5 permits have been issued and 28 thousand board feet of free-use timber has been cut and removed from Deer Island. None of the proposed alternatives for the analysis area would restrict the availability of firewood and personal use timber in the beach fringe. Roaded alternatives could actually increase the availability of firewood and free use timber, while roads are open and drivable during the life of the timber sale.

Cumulative effects

This evaluation considers whether the proposed action in combination with other past and reasonably foreseeable future actions, may significantly restrict subsistence uses.

The last timber sale on Deer Island took place in 1989 and harvested 456 acres. This past timber sale and this project together would result in approximately 11-16% harvest of the productive old growth of Deer Island.

The Deer Island VCU has approximately 7,358 acres of productive forest land. There is currently approximately 2,688 acres (37%) of productive forest considered suitable for timber harvesting. Approximately 4,670 acres of productive forest (63%) is retained and will be retained in the future within the Old Growth Reserves and other nonharvest areas. Rotation age varies by ecological landunit from 100-200 years (see Appendix F).

As discussed in this analysis (see deer section), past and proposed actions will have a minimal impact on subsistence. The analysis of specific effects related to the potential future projects mentioned in this section are beyond the scope of this document. They would be analyzed in future environmental assessment documents prior to implementation.

Kuakan Timber Sale Findings

The Findings are based on the evaluations presented above on abundance, distribution, supply and demand, access and competition for harvested resources in the study area, WAA 1902 and the Deer Island study area. The area does not seem to represent an extensively used subsistence harvest area. This is probably due to its remoteness from population centers and the location of better subsistence harvest areas closer to those population centers.

A finding that there will not be a significant restriction on subsistence uses is in order for wildlife, fish and shellfish, marine mammals, other foods, and timber resources.

Threatened and Endangered Species

The following discussions and analysis are based on and summarized from Wildlife Resources Reports for the Kuakan Project Area (1998), the Biological Assessments required for all threatened and endangered species, and the Biological Evaluations required for Forest Service Sensitive species. Direction for threatened, endangered and sensitive species is contained in the Forest Plan, Chapter 4.

Affected Environment

Threatened and Endangered Species

Biological Assessments were written to evaluate the effects of the proposed action on federally-listed threatened or endangered species. The Biological Assessments were submitted to the Fish and Wildlife Service for the American peregrine falcon and to the National Marine Fisheries Service for the humpback whale and Steller sea lion. Both agencies concurred with the findings of no significant adverse effects to these listed species. Consultation with the Fish and Wildlife Service and National Marine Fisheries Service during preparation of this document identified no inventoried resident threatened or endangered species in the project area.

Humpback Whale

A brief overview of population status and distribution for Humpback whales and Steller sea lions was provided by NMFS (letter of 23 Dec. 1998). The local distribution of humpbacks in Southeastern Alaska appears to be correlated with the density and seasonal availability of prey, particularly herring (*Clupea harengus*) and euphausiids (shrimp-like crustaceans). Important feeding areas include Glacier Bay and adjacent portions of Icy Strait, Stephens Passage/Frederick Sound, Seymour Canal, and Sitka Sound. Fishermen report seeing this species on a regular basis between October and December in the waters south of Deer Island. Usually at least a few individuals occupy Sunny Bay at this time during a herring run and it is believed that several whales move through the area during migration. Forest Service Interpreters at the Anan Bear Observatory located north of the project area hear and see whales on occasion and we have seen at least one individual in Ernest Sound in the summer. Although humpback whales do use the waters of Ernest Sound they are generally considered less common there.

Steller Sea Lion

The Steller sea lion ranges from Hokkaido, Japan, through the Kuril Islands and Okhotsk Sea, Aleutian Islands and central Bering Sea, the Gulf of Alaska, Southeast Alaska, and south to central California. Information on Steller sea lion population trends in Southeast Alaska is limited, but suggests that Steller sea lion populations are stable in Southeast Alaska. Steller sea lions are rarely seen during the summer field season but frequent Sunny Bay and Seward Passage starting in October according to local fisherman. This probably coincides with the same herring run that seems to attract humpbacks. The south end of Deer Island (Point Peter and Iron Point) has been identified as a sea lion haul out and two-three individuals have been reported there. Up to 15 individuals have been seen in the Santa Anna Inlet southeast of Deer Island and as many as 300 have been seen on Easterly Island six miles south of Deer Island (S.Ettafaugh, pers.comm).

American peregrine falcon

The primary cause of the decline in peregrine populations was reduced productivity resulting from biomagnification of chlorinated hydrocarbon pesticides occurring throughout their food chain. Bans in the use of these pesticides in the U.S. has allowed some of these populations

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to begin recovering. The USF&WS recently filed a Notice of Intent to consider down-listing this species but the scientific basis for doing so is being debated (Pagel et al. 1996).

The American peregrine falcon is primarily associated with interior Alaska for breeding, nesting and rearing of young. It is highly migratory, wintering as far south as Argentina, and occurs in Southeast Alaska during migration periods. Historically, an estimated 250 American peregrines occupied Alaska with a total of 1500-2000 pairs throughout North America (Craig 1986). Although there is little data on breeding biology, populations in Alaska appear to be stable (Forest Plan 1997).

Peregrines primarily feed on birds that frequent open areas such as shorebirds, passerines, gulls and waterfowl. Open areas such as bodies of water, estuaries, and marshes are important hunting habitats. Nest distribution is closely associated with large seabird colonies located on the outer coasts or nearby islands (Forest Plan, 1997).

Sensitive Species

Wildlife species listed as sensitive by the Regional Forester that may occur within the Project Area are Peale's peregrine falcon, Queen Charlotte (northern) goshawk, trumpeter swan and osprey. However, only the goshawk among the animal species is expected to occur in the Project Area for extended periods of time. Biological Evaluations, which focus on the likelihood of sensitive species becoming threatened or endangered, are required for potentially affected sensitive species, and have been completed. A determination of no effect was made for Peale's peregrine falcon, osprey and trumpeter swan. A more detailed discussion for the northern goshawk is included within the Wildlife section of this document.

Twenty-two vascular plants are designated as sensitive in the Alaska Region; fifteen are known or suspected to occur on the Wrangell Ranger District of the Tongass National Forest. Sensitive plant surveys located one sensitive plant, Choris bog orchid (*Platanthera chorisiana*) in two locations on the east side of Deer Island.

Environmental Consequences

THREATENED AND ENDANGERED SPECIES

The following analyses include discussions of the relevant mitigation measures from the Forest Plan. An additional mitigation discussion at the end of this section, as is included in most other Chapter 3 sections, is therefore not included.

None of the alternatives are anticipated to adversely affect the humpback whale, Steller sea lion, or American peregrine falcon. Biological Assessments for each species are included in the project planning record, and the effects analyses for each are summarized below.

Humpback Whale and Steller sea lions

No direct or indirect effects on whales or sea lions from implementation of forest management activities under any alternative are anticipated. Forest Plan forest-wide standards and guidelines for Threatened and Endangered species provide for the protection and maintenance of whale and sea lion habitats. All activities will be conducted in a manner consistent with the Marine Mammal Protection Act, the Endangered Species Act, and National Marine Fisheries Service regulations for approaching marine mammals.

Habitat degradation, acoustic disturbance and collisions/harassment by boats are the most likely effects of Forest Service activities on whales and sea lions. Habitat degradation associated with LTF's should not be significant. The marine benthic area affected should not be more than approximately 5 acres. The nearest haulout (Pt. Peter) is three miles south of the West LTF.

Acoustic disturbance could occur from boats, helicopters and other mechanized machinery. Much of this activity would be localized and close to shore. Boating activity would consist of log rafting and towing, and recreational activity. Constant speed and direction (e.g., log towing) is believed to elicit less avoidance behavior from whales than other types of boating activity. The exact effects of other recreational boating on whales is unknown but given the low use of the area by whales and sea lions it is not likely to be significant.

American Peregrine Falcon

Habitat degradation and reduction in prey availability are potential effects of Forest Service activities on peregrines. Standards and guidelines under the Forest Plan (1997) require protecting habitats for migrating peregrines as well as protecting seabird rookeries and waterfowl concentration areas (peregrine prey). There is no critical habitat in the project area. Although timber harvest activities in the sale area may result in localized changes in the distribution of prey species (waterfowl and shorebirds), there is no indication that overall numbers and availability of prey to peregrines would change.

SENSITIVE SPECIES

A determination of no effect was made in the Biological Evaluation for Peale's peregrine falcon, osprey and trumpeter swan. This timber sale may impact individuals and habitat for the Queen Charlotte (northern) goshawk but will not impact overall viability which is addressed in the Forest Plan. A more detailed discussion of effects on the northern goshawk can be found in the Wildlife section of the EIS.

The Biological Evaluation for Choris bog orchid determined that implementation of any of the action alternatives considered would "not likely" affect any individual plants or population.

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Transportation

Affected Environment

Access to Deer Island is by float plane or boat. There are no existing roads on the island. There is an existing log transfer facility (currently permitted) on the southwest end of Deer Island. This site is known as the Deer Island West log transfer facility (LTF).

Forest Development Roads are constructed to meet the minimum standard required for safe use by the intended user. On Deer Island, roads would be constructed to accommodate high clearance vehicles, log trucks, and mobile yarders. Specific design criteria are described in FSH 7709.56 (Road Preconstruction Handbook). Roads would not be constructed to meet the Highway Safety Act because they are not designed for use by passenger vehicles.

National Forest roads are classified based on current or anticipated use into one of three maintenance levels. Roads may also be obliterated or otherwise returned to an unroaded condition after use. Maintenance levels incorporate traffic service levels, as indicated in the following definitions. Applicable maintenance levels for the Project Area are:

- Maintenance Level 1 (Traffic Service Level D) - Roads are closed by bridge removal or organic encroachment and are monitored for resource protection. Basic custodial maintenance is performed to perpetuate the road and to facilitate future management activities.
- Maintenance Level 2 (Traffic Service Level C) - Roads are maintained for high-clearance vehicles and monitored for resource protection. Traffic is normally minor, usually consisting of administrative or recreational uses.
- Maintenance Level 3 (Traffic Service Level B) - Roads are maintained for travel by a prudent driver in a standard passenger vehicle and are subject to the provisions of the Highway Safety Act. Road use is by administrative and passenger vehicles, and logging trucks.

Environmental Consequences

The effects of the transportation system on other resources are considered in the specific resource sections (Fisheries, Soils, Subsistence, Water, and Wildlife). This section focuses on transportation system development for each alternative, and discusses post-project access management. **Only Alternatives 2 and 3 propose construction of a road system on Deer Island.**

Table Transportation-1 displays the miles of roads constructed by alternative. See road cards in Appendix B for details on each road segment. All temporary roads (usually short spurs) would be closed and/or obliterated after the completion of harvest.

Alternative 2 would have the most road construction, with 6.25 miles of specified road and 3.11 miles of temporary road for a total of 9.36 miles of road. Alternative 3 would have 3.10 miles of specified road and 1.04 miles of temporary road, for a total of 4.14 miles of road. Alternatives 4, 5 and 6 propose no road construction.

Forest Road System

Road Development

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Table Transportation - 1 Miles of New Road by Action Alternative

	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
System Roads	6.25	3.10	0	0	0
Temporary Roads	3.11	1.04	0	0	0
Total	9.36	4.14	0	0	0

Table Transportation-2 provides a summary of the costs associated with road construction, LTF construction and road maintenance. Specified roads cost approximately \$175,000/mile to build, which includes construction of the North LTF and major drainage structure costs. Temporary roads cost approximately \$120,000/mile. Redevelopment of the Deer Island West LTF would cost approximately \$50,000. Maintenance costs are estimated for a ten year period at \$698/mile/year.

Table Transportation - 2 Transportation Costs by Action Alternative

	Alt 2		Alt 3		Alt 4		Alt 5		Alt 6	
	Mile	Cost MM\$	Mile	Cost MM\$	Mile	Cost MM\$	Mile	Cost MM\$	Mile	Cost MM\$
System Roads (1)	6.25	1.09	3.10	0.54	0.0	0.0	0.0	0.0	0.0	0.0
Temporary Roads	3.11	0.37	1.04	0.12	0.0	0.0	0.0	0.0	0.0	0.0
West LTF Reconstruction	0	0.05	0	0.05	0	0.05	0	0.05	0	0.05
Maintenance	2.0	0.01	2.0	0.01		0.0		0.0		0.0
Total Project Transport. Costs		1.52		0.72		0.05		0.05		0.05

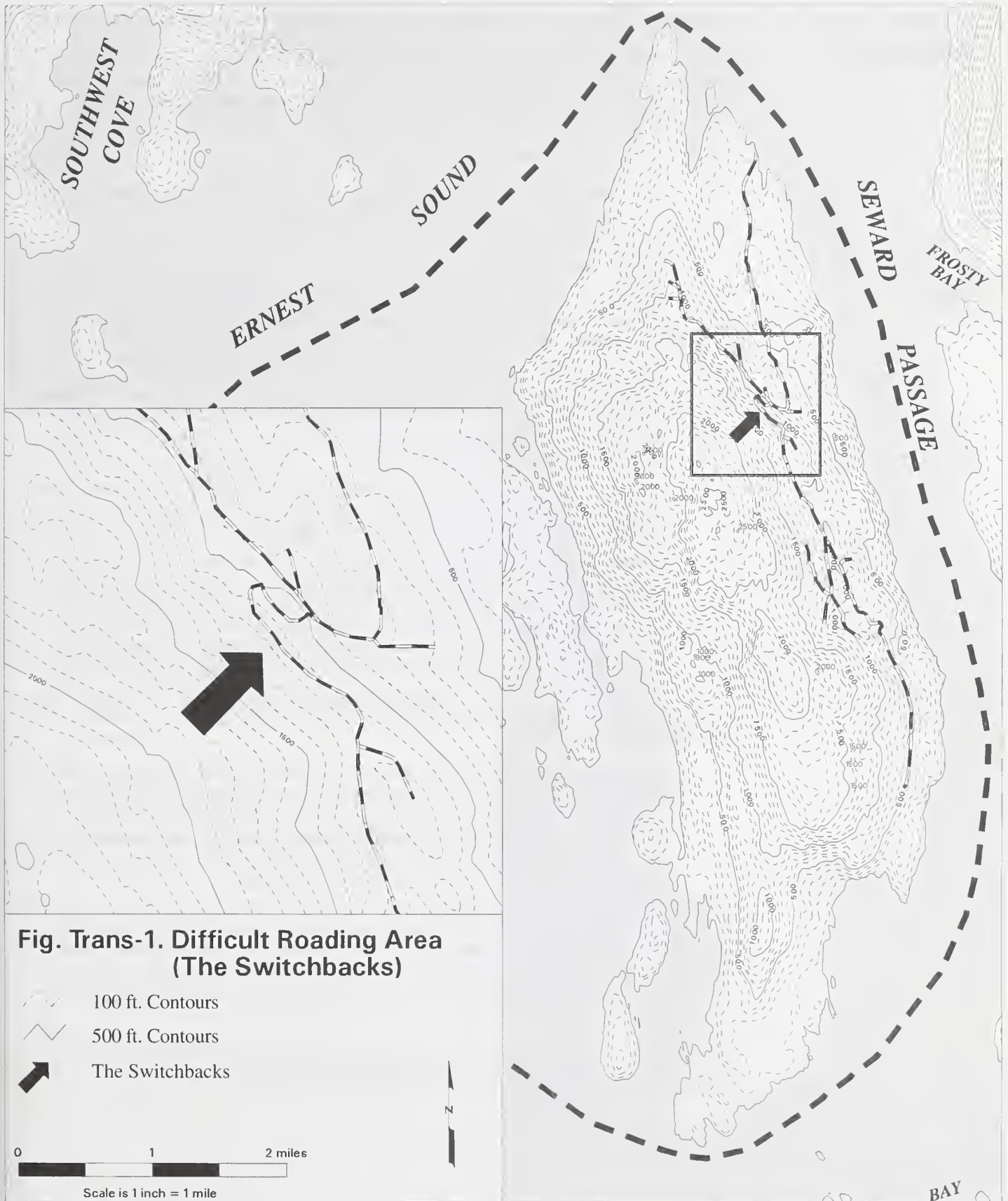
(1) includes northeast LTF, the "switchback," and major drainage structure costs

The Switchbacks

Figure Trans-1 shows all of the potential road system, including temporary roads. The box on the map shows an enlarged scale of the difficult road segment that we refer to as the switchbacks. This is the only feasible road route that we have been able to locate to access the east side of Deer Island. There are risks associated with constructing a road through the switchbacks. The road would have to traverse two sections (300-400 feet) of hillslope that are very steep (65-75%) and wet, a combination that could lead to mass failure, resulting in a landslide. There is a stable bench below the switchbacks that would probably stop the progress of a potential slide from either site, but not before a large scar was created. Road construction in this area is estimated to cost an additional \$95,960 above regular construction costs

The first steep site, located prior to the actual switchback, is approximately 100 feet upslope from the bench, in the headwaters of the Lost Creek drainage. A slide in this area would most likely terminate on the flat bench approximately 1 mile upstream from the furthest extent of fish habitat. A slide in this first area could be a chronic sediment producer to Lost Creek.

The second steep site, located beyond the actual switchback, occurs just prior to where the road enters a bench at the 1200 foot contour elevation. A slide in this area would also most likely terminate on the same bench, but would be located several hundred feet south of the first site. The road in this location is approximately 400-500 feet upslope from the bench. A slide in this spot would not be in the headwaters of Lost Creek, but would be in the headwaters of an unmapped intermittent stream. This stream, when it flows, cascades steeply down the east side of Deer Island, and contains no fish or fish habitat.



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Access Management

After the completion of harvest activities, roads are managed as necessary to control the type of use and kind of traffic. This is called access management. Road access is managed to prevent damage to the roadway, and to meet objectives for resources such as fish, water quality and wildlife, while maintaining public uses and access for timber management and related activities. The Wrangell Ranger District's access management program includes public and agency involvement, and interagency evaluation of road management objectives.

The following are the access management categories:

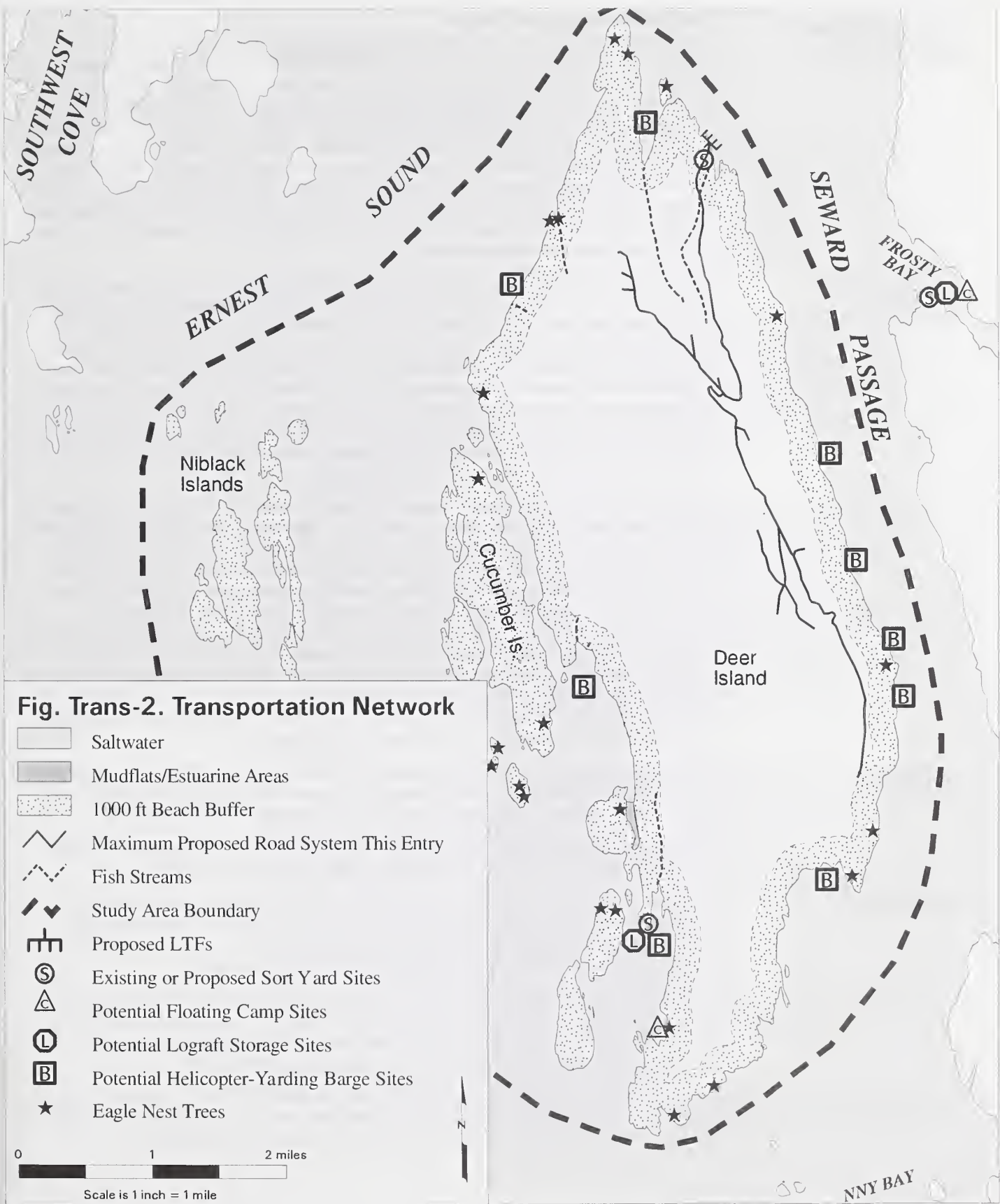
- Encourage - Motor vehicle use is encouraged by appropriate signing, public notification, and active maintenance of the road prism.
- Accept - Motor vehicle use is allowed but not encouraged, while the road is maintained for administrative access.
- Discourage - Motor vehicle use is discouraged by allowing alder growth at road entrance, nonremoval of blowdown, or road prism deterioration within acceptable environmental limits (depending on designated maintenance level). To discourage use, the road may also be signed as "Not Maintained for Motor Vehicle Traffic."
- Eliminate - Motor vehicle use is eliminated by physically blocking the road. Where prescribed for long-term intermittent roads, this strategy is achieved by placement of impassable barricades at road entrances. On short-term roads, removal of drainage structures effectively blocks vehicle traffic.
- Prohibit - Motor vehicle use is prohibited by a road order (CFR closure). Implementation of this strategy on remote road systems may require the installation of gates, in addition to public notification and appropriate signing.
- Prohibit Seasonally - Road is closed to motor vehicle use at times during the normal operating year. For all alternatives, seasonal prohibitions will be used as necessary to mitigate impacts to wildlife and subsistence resources (e.g., closure during either-sex deer hunting season). Administrative and permitted use of the roads will continue during closure periods, but only for specific permitted uses. Seasonal closures may be used in combination with cooperative efforts with fish and game protective agencies.

The access management strategy proposed for the Kuakan Project Area was developed with the following key points:

- All newly-constructed roads would be closed to motorized use at completion of the timber sale. Road use during the timber sale would be restricted to use directly associated with the timber sale. After the timber sale, roads from the switchbacks and beyond would be placed in storage and all drainage structures would be removed. This equates to a Forest Practices Act (FPA) status of "closure." Formal CFR road closures (prohibiting use) will be developed for all roads.

Road closure is considered for several reasons, including wildlife habitat protection and lack of maintenance funding. Roads under Forest Service jurisdiction can be closed by regulation (36 CFR 36 212.7 and 261). Applicable law confers a statutory right of entrance to public lands to search for minerals, and access to mining claims (the Project Area has none at present) would not be restricted. However, miners and prospectors would be required to obtain a permit to use restricted roads.

Efforts to minimize the visual impacts created by logging roads and landings are made during project planning. Where feasible, roads and landings with a visual quality objective of Modification will be located to minimize or eliminate their visibility.



3 Environment and Effects

Deferred Road Maintenance

Road Maintenance after Harvest

Although specified roads are considered an economic asset, there are additional costs associated with maintaining those roads after harvest activities end. Road maintenance requirements are greatly reduced by closing out the road after use. Routine maintenance ensures drainage structures are functioning and excessive erosion is not occurring. The estimate for deferred road maintenance is \$698 per mile per year. This includes, hand road maintenance of ditches, culverts and brushing roadsides. This annual maintenance cost only applies to that portion of the roads that are not placed in storage, but are kept in a drivable condition. Alternatives 2 and 3 would both keep the first two miles of the mainline road in a drivable condition for administrative use, but closed to motorized traffic. The estimated cost of road maintenance for Alternatives 2 and 3 would be \$1,396/year. Alternatives 1, 4, 5, and 6 would have no road maintenance costs.

Log Transfer Facilities

The existing log transfer facility (Deer Island West LTF) site on the southwest side of Deer Island may be used to implement any of the alternatives. Reconstruction and use of the site would be an option for the timber sale purchaser. Use of the site would require replacement of the bulkhead. The bulkhead would be removed upon completion of the timber sale and the site would be recontoured to original shape. The LTF site at the north end of the island would only be constructed in Alternatives 2 and 3. Logs would not be placed in the water at this site, but would be transported directly from land to a barge. The potential also exists to reopen the Frosty Bay LTF as a temporary sortyard for handling logs that have been flown to barges. Use of the LTFs will depend on the alternative selected and may vary depending on the purchaser of the timber sale and their specific needs.

One potential environmental impact associated with LTFs is the accumulation of log debris in the marine environment. During the transfer of logs from land to water, bark is sloughed off and could be deposited on the ocean bottom. Bark also can be sloughed off by agitation due to wind and waves while the logs are bundled together in rafts. Bark accumulation on the ocean bottom can diminish habitat for bottom-dwelling crustaceans and mollusks, as well as hamper underwater vegetation used as food and rearing sites for marine fish and other organisms. The discharge of bark into the water at an LTF is a discharge requiring a National Pollution Discharge Elimination System (NPDES) permit. At the existing LTF on the southwest side of Deer Island, the environmental effects from this timber entry will be limited to that allowed under the existing permit. In addition, a new permit for the northeastern LTF will be obtained if Alternative 2 or 3 is selected. Figure Trans-2 displays the LTF locations on Deer Island. See Appendix D for additional LTF discussion.

Camps

No land-based logging camps are planned for this project. Permits for floating camps would be obtained by the purchaser. Two areas that have been used in the past and could be used again for floating camps are the Deer Island Southwest Anchorage, and Frosty Bay.

Figure Trans-2 displays likely areas where log rafts may be stored, floating logging camps may be anchored and barges may be anchored to facilitate helicopter logging.

Mitigation

Mitigation measures for forest resources applicable to road location, construction and/or design are specified on the unit and road cards (Appendices A and B). These follow the requirements of the Forest Plan, the Best Management Practices, and other direction. Many of these are discussed under the specific resource sections of this chapter.

If an alternative is chosen that constructs the LTF on the northeast shore of Deer Island, the LTF would be designed as a barge ramp facility. No logs would be dumped into the water at this site. Barging of all logs from this site would help to mitigate impacts to the marine environment. See Appendix D for more information on the potential LTF.

A system of barges will be used to collect logs when logs are not flown to a road, to prevent loss of logs (sinkers) and accumulation of excessive amounts of slash. All slash generated on the barges will be disposed by burning, or by scattering it back in harvest units.

Wetlands

Affected Environment

Wetlands are defined as "those areas that are inundated or saturated by surface or groundwater with a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions" (40 CFR 230.41 (a)(1)). "Frequency and duration" of a groundwater table sufficient to support a prevalence of hydrophytic plants can include areas where the groundwater table is 12 inches below the soil surface for as little as two weeks during the growing season. The Corps of Engineers Wetlands-Delineation Manual, 1987 describes the three parameter approach that is used to determine if an area is a wetland.

The majority of wetlands in the project area are on the north end of Deer Island and on the rounded summit in the middle of the island. Wetlands are found scattered across the island, occurring in areas with gentle slopes. Wetlands are categorized by the type of vegetation they support for the purpose of discussion in this document. The CLU (common land unit) spacial database was the primary means of assessing wetland location and type. The wetland types found on Deer Island are estuarine, forested, forest/muskeg, muskeg, muskeg/forest complex, and tall sedge fens.

Forested Wetlands

Forested wetlands consist primarily of slope bogs supporting coniferous forests. Tree cover ranges from a minimum of 10 percent to about 60 percent canopy cover. Tree height is at least 25 feet. Plant associations (Pawuk and Kissinger, 1989) are primarily Mixed Conifer/Blueberry/Skunk Cabbage, Mixed Conifer/Blueberry/Deer Cabbage, Western Hemlock/Blueberry/Skunk Cabbage, Shorepine/Blueberry, and some Mountain Hemlock/Blueberry/Skunk Cabbage. Soils are typically very poorly drained organic soils, or poorly and very poorly drained mineral soils. There are 1,390 acres of this wetland type in the project area. The capability of some of these wetlands (those with organic soils) to produce a commercial forest is currently being studied. Until it has been determined that Forest Wetlands with organic soils are capable of producing at least 20 cu.ft. per year, these sites will not be harvested (USDA, 1999).

Estuarine

A 10 acre salt marsh/mudflat wetland occupies the inlet on the southwest side of Deer Island. Other small bays have mudflats with a fringe of salt-marsh type vegetation on the boundary between the marine environment and the upland forests such as the small mudflat found at the mouth of Bear Creek. The intertidal areas contain a variety of salt tolerant sedge communities arranged according to differences in elevation and corresponding frequency of salt water inundation. The higher, less frequently inundated areas typically contain highly diverse grass/sedge/forb communities. Salt marshes have poorly drained mineral soils that have higher pH values and nutrient content than other wetland types.

Forested Wetland/Forest Non-wetland Complex

These areas consist of a mixture of forest wetlands as described above and non-wetlands in a complex mosaic related to the microtopography and subsequent drainage and water regime. Approximately 500 acres of this wetland type are mapped in the project area. These areas make up the majority of wetland acres included in potential timber harvest units.

Forested Wetland/Sphagnum Peat Bog Complex

These wetlands are a complex of forested wetlands as described above, and sphagnum bogs as described below. Approximately 1400 acres of this wetland type occurs in the project area.

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Sphagnum Peat Bogs

Sphagnum bogs, locally called muskegs, have deep peat soils. The high amount of free water reduces aeration necessary for organic matter decomposition resulting in the accumulation of peat deposits overtime. Soils are very poorly drained, moderately deep to deep, extremely acid peat soils. Tree cover is less than 10 percent, consisting mainly of stunted shore pine with lesser amounts of western hemlock, mountain hemlock, and Alaska yellow-cedar. Common shrubs include juniper, Labrador tea, crowberry, mountain cranberry, dwarf blueberry, bog laurel, and bog cranberry. These wetlands function as areas for recharge of groundwater and streams, as deposition and storage of sediment and nutrients. There are approximately 1,600 acres of this wetland habitat in the area.

Emergent Sedge Wetlands

Emergent sedge wetlands are open (non-forest) fens. Unlike bogs, shore pine are usually not present in fens. Oregon crab apple and highbush cranberry are common on the margins of fens. Soils are poorly and very poorly drained, and moderately deep to deep organic soils. Soil and water in fens typically are less acid and have a higher nutrient content than sphagnum bogs. They usually occur along streams or on the fringe of muskegs. Approximately 200 acres of this wetland type are in the project area.

Subalpine

Subalpine wetlands as used here, are primarily high elevation (1800 to 2300 feet) slope bogs that occupy the sloping to steep summit of mountains. They are typically dominated by dwarf shrubs, low sedges and various forbs, especially deer cabbage. Trees include widely scattered stunted mountain hemlock, Alaska yellow-cedar and less frequently shore pine. Shrubs include some alpine species typically yellow mountain heather, Merten's cassiope, luetkea and copperbush. Soils are typically poorly and very poorly drained shallow organic soils over bedrock. There are 90 acres of subalpine habitat mapped in the project area.

There is a concern with harvesting timber on wetlands with organic soils. The Regional Forester specifically identified 4 soil series to avoid harvesting on due to low site productivity. There is a question as to whether or not these sites are capable of producing 20 cubic feet of wood per acre per year (definition of commercial forest land). Preliminary results of a study show these sites probably are capable of producing the minimum amount of wood to be considered commercial forest lands.

Environmental Consequences

Direct impacts on wetlands are expected from road construction in Alternatives 2 and 3. Roads have been located to avoid wetlands where possible. Alternative 3 will construct 2.7 miles of road across wetlands. Alternative 2 will construct the same 2.7 miles plus another 1.8 miles of road across wetlands. A 21-foot wide road width was used to calculate the amount of wetland affected by road construction. As shown in table Wetland-1, a total of 11.5 acres and 6.8 acres of **Forested and Sphagnum Peat Bog** wetlands will be affected in Alternatives 2 and 3 respectively. The road cards discuss specific measures to minimize impacts on wetlands for alternatives that include road construction.

Harvest on wetlands is generally avoided due to the low timber volume. All alternatives include some harvest on wetlands. Alternative 5 affects the most acres of wetlands, but uneven-aged management prescriptions retain most of the volume within each stand. The effect of timber harvest on the forested wetlands is a temporal change in vegetation type.

Table Wetland - 1 Acres of Affected Wetland by Alternative

Wetlands impacted by:	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Road Construction	0	11.5	6.8	0	0	0
Timber Harvest	0	45	53	75	200	74

Wildlife

This section discusses impacts to key wildlife species or groups that have been identified as important in the analysis of this project. Additional effects to wildlife are discussed in the TES, Biodiversity and Subsistence sections of this document.

Affected Environment

Endemic Mammals (Small and Medium-sized mammals)

There is a concern for the long-term viability of endemic small mammal populations on the islands of the Tongass National Forest. Endemic is a word used to describe a unique subspecies that may only occur in an isolated environment, such as on an island. Despite the lack of a systematic inventory of biotic diversity on the Tongass, 38 mammal taxa have been described as endemic to this region of North America (MacDonald and Cook 1994). Timber harvesting on islands may threaten the ability of small mammal populations to persist if harvest units and roads limit dispersal capabilities, remove critical habitat or increase predation. To specifically address this concern, all islands less than 1,000 acres were removed from the timber base and important corridor habitat was protected within riparian and beach zones (USDA, 1999).

The Forest Service is to conduct surveys on any island less than 50,000 acres and survey "endemic mammals prior to any project that proposes to substantially alter vegetative cover." Surveys are intended to "emphasize small (voles, mice, and shrews) and medium-sized (ermine and squirrels) endemic mammals with limited dispersal capabilities that may exist within the project area." (USDA Forest Service, 1997b). Data is currently being collected and analyzed as part of Tongass-wide studies addressing small mammal concerns. The Forest Science Lab is studying small mammals to understand how they use various types of habitat, and the University of Alaska is assisting the Forest Service in identifying endemic populations. Information gathered on Deer Island contributes to these studies.

We trapped small mammals on Deer Island in 1997 and in 1998 for the purpose of a pre-timber sale inventory and to meet the direction of the Forest Plan (Small mammal resource report 1998). We set a total of six transects to capture voles, shrews and mice and a total of 4 transects with the objective of capturing ermine and squirrels for a total of 1,952 trap-nights. Transects intersected each of the ecological zones on the island as described by the interdisciplinary team. These efforts were intended to provide presence/absence information but were not designed to analyze the effects of harvest units or roads.

A total of four species and 62 individuals were captured as a result of these small mammal trapping efforts on Deer Island (Table Wildlife-1). The Keen's mouse (*Peromyscus keeni*.) was trapped in greatest abundance (n = 31) and the red squirrel (*Tamiasciurus hudsonicus*.) was trapped the least (n = 1). This report lumps the two shrew species due to the difficulty in identifying these in the field (*Sorex monticolus* and *Sorex cinereus*). At least three *S. cinereus* were verified based on dental formulas (A.Runck, pers. comm). All specimens have been sent to the University of Alaska, Fairbanks for further identification and to be stored with the museum mammal collection. To date, none of these have been classified as "endemic" to Deer Island. Efforts to trap ermine and northern flying squirrels were unsuccessful.

Table Wildlife - 1 Capture record for Deer Island Transects

Transect Number and Date	*Number of Sorex	Number of <i>Peromyscus keeni</i>	Number of <i>Tamiasciurus</i>	Total Captures	Trap nights	Animals /trap-night
1 (Aug. 1997)	5	2	0	7	306	.02
2 (Aug. 1997)	0	2	1	3	124	.02
3 (Aug. 1997)	0	3	0	3	30	10
4 (Aug. 1997)	0	0	0	0	30	0
1-4 (Mar. 1997)	4	9	0	13	962	.01
1 (June 1998)	6	2	0	8	172	.05
2 (June 1998)	15	13	0	28	328	.09
Total	30	31	1	62	1952	.03 avg

* *Sorex monticolus* and *Sorex cinereus* collected

Interesting presence/absence information that we gained from these efforts include documenting two shrew species (*Sorex*) and the absence of the southern red-backed vole (*Clethrionomys gapperi*). *Sorex monticolus* is more widely distributed on the islands of the Tongass than is *Sorex cinereus* (MacDonald 1994). *Clethrionomys* may exist on Deer Island but it is unlikely given the success of trapping this species in similar habitat on Wrangell Island (W. Smith, pers. comm), however we may have trapped during a low cycle in the *Clethrionomys* population. Our inability to capture ermine or northern flying squirrels does not mean that these species do not occur on Deer Island. Both of these species can be difficult to capture, even where they are known to exist.

Northern goshawk

The northern goshawk (*Accipiter gentilis atricapillus* and *A.g. laingi*) is an old-growth/mature forest associated raptor of special concern on the Tongass National Forest and a key consideration for the viability assessment of the new Forest Plan (Iverson et al. 1996, USDA Forest Service, 1997b). Concern for the goshawk stems from reductions in preferred habitat due to timber harvesting. The Forest Plan provides for goshawk viability through low or no-harvest land allocations and standards and guidelines for protecting nest sites.

Goshawks make extensive use of productive old growth forests for foraging and nesting. Radio-telemetry studies of goshawks on the Tongass indicate habitat selection for medium to very high volume old-growth forest (Iverson et al. 1996). Iverson et al (1996) reported 68% of radio-collared goshawk relocations in productive old growth and 3.7% of the relocations in young, second growth forests. Productive old growth forests support a wider range of important prey than do other habitat cover types (Iverson et al. 1996). Recommendations for maintaining goshawk viability include maintaining 1/3 of the landscape in 0-100 year old stands, 1/3 in 100-200 year old stands, and 1/3 in 200-300 or older stands (high value). The Forest Plan retains over 60% of the productive old-growth forest in the Kuakan project area through LUD designations (Old-growth and Semi-remote Recreation) and standards and guidelines (beach and estuary fringe, riparian buffers, oversteepened slopes).

Landscape factors such as slope and elevation along with beach, riparian and estuary locations are important to goshawk habitat suitability. Most goshawk radio-telemetry relocations on the Tongass were in lower elevations (less than 800 feet) but use closely matched availability. Most relocations were on slopes less than 35% but use was not significantly different below 75% slope (Iverson et al. 1996). Riparian zones ranked as the most important landscape component by radio-marked goshawks (Iverson et al. 1996). Telemetry results also indicate disproportionate goshawk use (high use compared to what is available) of the 1000 foot beach and estuary fringe buffer (Iverson, 1996). Beach, estuary and riparian habitats generally support greater prey diversity and net prey productivity, features important to goshawk habitat quality (USDA Forest Service, 1997b).

We conducted courtship surveys, broadcast surveys and nest surveys on Deer Island in 1997 and 1998. One goshawk nest was located as a result of broadcast surveys in 1997 and an alternate nest was located in 1998. Both nests fledged young. A third nest was located in 1999 approximately 1/4 mile south of the 1997 nest but it is too early to know if it will be successful. Presumably all three nests belong to the same pair of birds but we were unsuccessful in our attempt to radio-tag these birds. Current standards direct the Forest Service to "maintain an area of not less than 100 acres of Productive Old Growth generally centered around the nest tree" (USDA Forest Service, 1997b). We also observed goshawks flying above Canyon Creek and perched within Unit 11 (Raptor resource report 1998).

Management Indicator Species -- deer and marten

Management Indicator Species (MIS) are vertebrate or invertebrate species whose population changes are believed to best indicate the effects of land management activities. These species are termed indicator species due to their importance to the ecosystem and humans, and as an indicator of habitat quality. A species selected as an indicator may be threatened or endangered; commonly hunted, fished or trapped; or a non-game species of special interest. Taking a look at the MIS in an area is consistent with the National Forest Management Act that requires that management indicator species be identified for each national forest and be used for environmental analysis.

The Forest Plan points out the problems with the MIS approach and points to the importance of a "coarse-filter approach" or looking at overall impacts to the old growth ecosystem (see Biodiversity section of this document). As a result, the Forest Plan limits the use of habitat capability models to deer. We chose deer and marten as our management indicator species for this project and used recent habitat models to display effects.

Deer

Research on habitat use by the Sitka black-tailed deer provided the Forest Service with the foundation for the deer habitat model. Under intermediate and deep snow conditions, deer select habitats that provide for snow interception and food availability. Old growth forest types with scattered small openings modify snowfall sufficiently to promote forage availability and movement of deer. The nutritional value of plants grown in partial shade (ex. old-growth) is also higher than that of plants grown in full sunlight (ex. clear-cut opening) (Hanley et. al. 1989). Timber harvesting of old growth can lead to reductions in deer wintering habitat during winters with deep snow, and as the stand ages and shades out understory browse plants. This in turn can effect the population distribution of deer. Predator search time is reduced when deer are forced to concentrate into smaller, predictable blocks of cover (Suring et. al. 1992).

The deer habitat capability model assigns optimal values to higher volume old-growth/mature stands on south-facing slopes at lower elevations in watersheds with low propensity for deep snow. Variables important in the deer model include: timber volume (high, medium, low, other), post-harvest types, snow accumulation, elevation and aspect. Wolves also have an effect on deer populations which is accounted for in the model. *There are a number of ways to adjust the deer model to reflect retention, none of which have been tested. We chose one strategy for the DEIS and clearly defined our methods in the anticipation of public feedback. After receiving comments on the DEIS and talking to State biologists, we reran the deer model for the FEIS by creating a post-harvest volume layer. Using this strategy we do not change HSI values but refine the input data (volume) going into the model. Running the model with a post-harvest volume layer results in no change in our analysis for effects on high value habitat (Table Wildlife-2) but slight changes (insignificant) in deer population numbers between the DEIS and FEIS (Table Wildlife-3).*

We use the deer habitat model to estimate how many deer the habitat can support for subsistence analyses. The Deer Island Value Comparison Unit (or WAA) is capable of supporting 490 deer (33 deer/sq. mile, see Table Wildlife-3) and a resident wolf pack under current conditions based on the revised deer habitat model (USDA Forest Service, 1997a).

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Based on the low level of browsing, general lack of sign in the study area, and resident wolf pack, we feel that the deer population is relatively low (below carrying capacity) and has been for some time. Wildlife surveys in 1984 reported more deer sign than what we saw in 1997-1998 (Waters, 1984. Unit Cards). Low deer populations are reported in the 1976 Deer Island Management Plan and this is attributed to a scarcity of summer range (Waters, 1976).

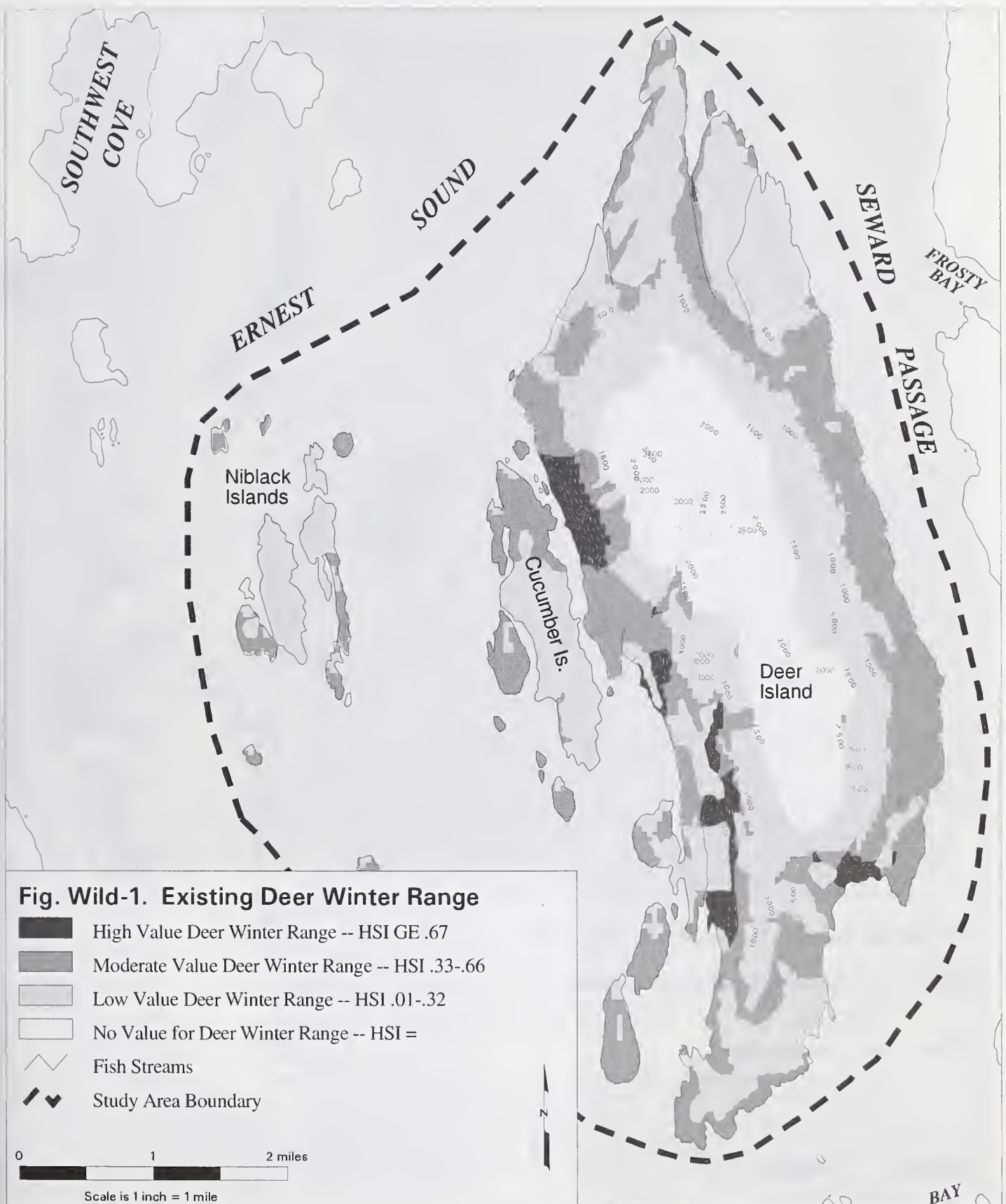
Sitka black-tailed deer is by far the most important, and most "harvested" terrestrial wildlife species for subsistence purposes, and for sport hunting (USDA Forest Service, 1997b). Biologists estimate that roughly 10% of the population can be harvested at carrying capacity with the population remaining stable and hunter satisfaction remaining high (Suring et al. 1992, see Subsistence section). The average ten year harvest for this area is 2 deer/year (ADF&G harvest report).

Important deer habitat areas can be found on all areas of Deer Island. According to our most recent model, important deer wintering habitat is largely contained within the beach fringe on the west side of Deer Island of which some has already been harvested (fig. Wild-1). Based on habitat "quick cruise" surveys in 1997-1998 we have identified important areas within stands on the north and east side of the island as well. Most of the sign we observed was within the large muskeg complexes at high elevations, within young second-growth stands and along riparian corridors on the west side. The heavy use seen in higher elevation muskegs may be a result of a scarcity of deer summer range on the island (Deer Island Unit Management Plan, 1976) but we never observed an abundance of forage in these muskegs. Biologists in 1984 listed the current LTF site (southwest) as "the most heavily utilized winter habitat observed on the island." These earlier surveys also identified important winter range habitats along Canyon Creek and a stream on the northwest side. Surveys in 1977 state that the north and south tip of the island are the areas of most significant deer winter use (Deer Island Management Plan, 1976).

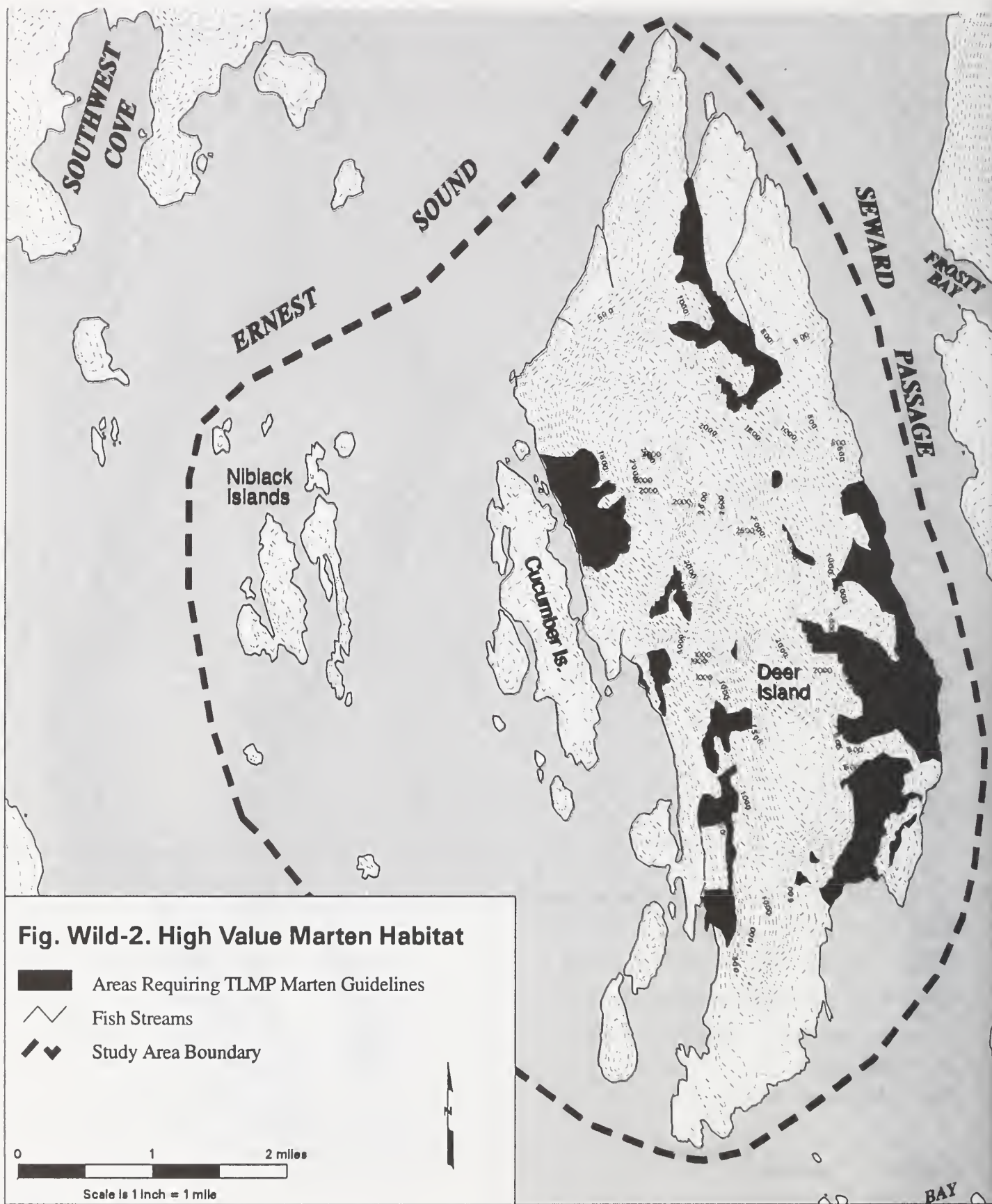
Marten

Marten have been addressed in the Forest Plan through the old-growth conservation strategy. Marten are "clearly associated with late seral and old growth forests and ... function ecologically at broad landscape scales" (USDA Forest Service, 1997b). Beach fringe and riparian habitats are believed to be highly important to this species. The marten is a broadly ranging species and conifer corridors facilitate movement and dispersal between patches of habitat (USDA Forest Service, 1997b).

Marten are trapped for their fur and populations in southeast Alaska are susceptible to overharvest. ADF&G (1991b) reports moderate to high marten populations with numbers decreasing in heavily trapped areas. There has been no harvest of furbearers on Deer Island in the last ten years (Tom Paul, pers. comm.) Marten densities decrease (due to their susceptibility to over-trapping) when road densities exceed 0.2 miles of road per square mile, and marten densities may be reduced by as much as 90 percent when road densities approach 0.6 miles of road per square mile, if trapping is not regulated.



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Wolf

The Alexander Archipelago wolf is considered a species of concern and wolf habitat needs were a key consideration in the development of the new Forest Plan. Wolves in Southeast Alaska prey on Sitka black-tailed deer, moose, mountain goat, beaver, black bear, spawning salmon and geese. The total population is estimated at fewer than one thousand individuals in all of southeast Alaska with approximately 200 being harvested annually (Kirchoff 1991)

Two viability concerns for the wolf were addressed in the Forest Plan: 1) the short-term concern involves increased wolf harvest and 2) the long-term concern involves large reductions in deer habitat capability (USDA Forest Service, 1997b). The greatest area of concern over wolf harvesting is for north Prince of Wales, where wolf harvests may be high relative to the existing population. Wolf harvests have been increasing in GMU-3 (the area including Deer Island). Current hunting and trapping of wolves on Deer Island is low with no animals reported harvested in the last 10 years (ADF&G 1998). A Habitat Capability of 18 deer/sq. mile is recommended to support both wolves and a huntable deer population (ADF&G letter on file).

Roads increase the risk to wolf viability due to the potential for an increase in hunting, trapping and poaching. Of the wolves killed in GMU 2 since 1985, 46% were taken along the road system (cited in Kirchoff 1993). The management of roads is an important component of the Forest Plan wolf conservation strategy.

Songbirds, waterfowl, shorebirds, other raptors

At least 37 bird species were recorded on Deer Island during the 1997 field season, including 16 neotropical migratory bird species. The birds observed most frequently (highest number of days) were the hermit thrush, pacific-slope flycatcher, and the chestnut-backed chickadee. Birds observed less frequently were the belted kingfisher, northern flicker, orange-crowned warbler, ruby-crowned kinglet, several waterbirds and all raptor species (Resource report on birds 1998, Resource report on raptors 1998).

Of the three songbird Management Indicator Species, hairy woodpeckers and brown creepers were recorded most frequently, followed by the red-breasted sapsucker. We noted brown creepers and hairy woodpeckers in the same stand as the active goshawk nest in 1998. The North Old-growth Reserve option encompasses many of the stands where we reported these three MIS (Resource report on birds, 1998).

We did not locate any important areas on Deer Island for waterfowl or shorebirds. There is a small estuary on the north end at the mouth of Canyon Creek. We saw no evidence of high use at this spot but did observe ten northern shovelers and a common merganser pair in early May. We also flushed six least sandpipers from the grass at the old LTF site on the west side in July, possibly an early migrant flock. There was no evidence of nesting by Vancouver Canada Geese or Harlequin Ducks.

The Forest Plan requires that we protect raptor nest sites and minimize nest site disturbance. We have located goshawk nests and bald eagle nests within the study area (see Goshawk section). Sharp-shinned hawks, barred owls and red-tailed hawks have been observed on the island but no nests have been located. The sharp-shinned hawk was seen in the same area both seasons and with a fledged brood in 1998. We will conduct more nest-searching earlier in the season to attempt to find this nest. We are unsure whether the red-tailed hawk or the barred owl are nesting and were unable to pinpoint a potential nesting stand. Twenty-two bald eagle nests have been mapped by the USF&WS.

Marbled Murrelet

The marbled murrelet is a small seabird with black and white winter plumage that uses old-growth stands for nesting. Marbled murrelets are listed as a threatened species in Washington, Oregon and California and attention to this special emphasis species is increasing in Alaska. The Forest Plan states "The listing of this species in WA, OR and CA and the reductions in habitat from timber harvesting, have raised concerns for the viability of

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this species in Southeast Alaska". Global population trends are considered to be downward for all populations that rely on large, commercially valuable conifers for nesting. Estimates of murrelet numbers in southeast Alaska range from 45,000 to 250,000 (DeGange 1996).

There are no nest records of marbled murrelets in the Deer Island area. During the 1997 field season, offshore boat surveys were conducted using a standard protocol for surveying marbled murrelets in forested sites (Resource report on murrelets 1997). We recorded inland activity at three sites on the east side indicating potential nest stands but failed to record any inland activity on the west side of Deer Island. Two of these inland sites exist within the North Reserve Option (see Old Growth Reserve discussion in the Biodiversity section).

Keen's Myotis

The distribution of *Myotis keenii* in Southeast Alaska is poorly understood and additional field studies are necessary to describe habitat associations (MacDonald and Cook 1994). Timber harvest could remove potential habitat of Keen's Myotis in the form of snags and hollow trees.

Harlequin Duck

The western population of Harlequin ducks is believed to be stable with 200,000-300,000 individuals. During the breeding season the Harlequin Duck nests along rapidly flowing streams and rivers (ADF&G 1994). Nests are generally built close to water, on the ground in dense vegetation underneath a tree root or in a rock crevice.

Spotted Frog

Spotted frogs are generally found in or adjacent to permanent freshwater bodies, usually in association with grasses, sedges and rushes. Habitat on Deer Island is limited with only one freshwater lake on the north end. There are no historical records of spotted frogs in this general area but they have been reported for the Stikine River basin (Waters 1992). We have no reports of amphibians for the island.

Olive-sided Flycatcher

Olive-sided flycatchers breed in Alaska and winter primarily in northern South America. Preferred nesting habitat includes open conifer stands and forested areas on the edge of openings such as muskegs, ponds and clearcuts. Snags are an important habitat component but the olive-sided flycatcher is generally not considered an old-growth dependent species.

Environmental Consequences

Effects to small endemic mammals

Little is known about the habitat relationships of small mammals, therefore it is difficult to evaluate the effects of timber harvesting. The red-backed vole is generally considered a forest-dependent species but we failed to capture any on this island. One recent study in Southeast found higher small mammal densities (for *Sorex*) in even-aged 30 year old stands than in old-growth (Hanley, 1996). Our trapping efforts in one young second-growth stand were successful but we lack the sample size to make a definitive statement about this habitat type.

While we have no record of any endemic species on Deer Island we cannot say for certain that they do not exist. Deer Island is approximately 1/2 mile from the mainland which means it is less isolated than many of the islands on the Tongass. The Old-growth Reserves and protected forested corridors will provide habitat and dispersal zones for endemic mammals. At least 60% of the 7,358 acres of productive old-growth within the project area will remain at the end of the rotation. As directed in the Forest Plan, we are leaving forest structure within many of our harvest units consistent with marten guidelines. These harvest prescriptions will benefit small and medium-sized mammals on Deer Island as well. We have implemented all the Forest Plan standards for endemic small mammals in all alternatives.

Small mammal dispersal was a factor in designing Alternative 5, which retains a high percentage of forest structure within harvest units and limits the size of forest openings. This alternative would be the most beneficial to small mammals, such as the northern flying squirrel (if present), that require standing trees for dispersal. Alternatives 3 and 6 minimize effects to small mammals by harvesting fewer acres this entry than other alternatives, and therefore retaining more of the landscape in its current condition. However, the individual units of these two alternatives may serve to be more of a dispersal barrier to small mammals than the units in Alternative 5, due to the lower average retention of trees within the units (see Biodiversity section, Table OG-4). Alternatives 2 and 4 harvest the most acres, and may be the least responsive to small mammal concerns in the short term. Alternative 4 retains more trees (avg. 21%) within harvest units than Alternatives 2, 3 (both at 16%) and 6 (11%), but considerably less than Alternative 5 (65-75%). The retention within Alternative 5 would be subject to a second and possibly a third entry during the first rotation. The retention within units in Alternatives 2, 3, 4 and 6 would most likely be left as a legacy into the next rotation.

Effects on goshawks

At the biogeographic scale, most of the concern for goshawk viability centers on North Prince of Wales Island. An estimated "95 percent of the goshawk range on the Tongass currently has a high likelihood of sustaining goshawk habitat (<33 percent of old-growth harvested)". In 1997, the U.S. Fish and Wildlife Service decided not to list the goshawk as endangered under the Endangered Species Act after reviewing the goshawk habitat conservation measures in the Forest Plan.

The Forest Plan addresses goshawk viability and we are implementing the goshawk standards and guidelines accordingly. To meet Forest Plan standards, nest buffers of 100 acres have been designed for all three nests to include productive old growth with structure that is similar to the nest site. We chose to leave more forest structure (up to 75%) in the harvest units near the nest sites in Alternatives 2, 3 and 4, and in a unit where we have seen goshawks, to reduce potential effects to the birds.

We can look at the potential effects to the nesting pair on Deer Island by comparing the amount of medium-high productive old-growth removed by alternative (see Biodiversity section, Table OG-2), however, we suspect that these birds use forested habitat off of the island as well (C.Flatten, pers. comm). Alternatives 5 and 6 are designed to have less impact

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on the Deer Island goshawk pair by moving the Old-growth Reserve to the north end to include known goshawk nest sites. Alternative 5 and 6 have similar impacts on medium-high productive old-growth but Alternative 5 will retain more forest structure within units following this entry, and is believed to be the most responsive to goshawks. Alternatives 2 and 3 construct a road in close proximity to the 1997 nest site. We will mitigate these effects in these alternatives by "allowing no continuous disturbance likely to result in nest abandonment within the surrounding 600 feet from March 15 to August 15." Alternative 2 and 4 harvest the highest amount of old-growth (see Biodiversity, Table OG-2), and retain less structure within the harvest units than Alternative 5, but more than Alternative 6 (see Biodiversity, Table OG-4). In the short term, Alternative 5 is believed to be the best alternative for Deer Island goshawks followed by Alternative 6, 3, 4, and 2. All alternatives will meet or exceed Forest Plan Standards for the protection of goshawks and goshawk habitat.

ADFG and the Forest Service are assisting in a study to look at the importance of prey species to goshawks. We know of no studies that link fragmentation of habitats in Southeast to goshawk reproductive performance. From previous telemetry studies we know that goshawks utilize edge habitats and sometimes forage within clearcut openings. Therefore, it would be premature to say that logging will reduce prey species for goshawks to an unacceptable level or that any amount of edge habitat has a negative effect. We have worked closely with ADFG goshawk biologists and with the USFWS to delineate nest buffers and account for potential logging disturbance.

Effects on Management Indicator Species -- deer and marten

Habitat "scores" produced by the models are often linked to the carrying capacity of a species for purposes such as a subsistence analysis. However, the ability of models to predict animal populations has been criticized. To understand the effect of habitat changes on populations, model scores need to be linked to mortality, natality, habitat patch size, emigration and immigration estimates. Furthermore, to predict a future population, information on the population's current density and age and sex composition is also required. In short, we are unable to predict wildlife populations into the future, except in the most general of terms. Wildlife habitat capability models, are best suited for comparison of habitat availability between alternative land management proposals. For subsistence purposes we must stretch the limits of our models and estimate the deer population that the habitat can support.

Deer

Standards and Guidelines in the Forest Plan consider deer winter habitat in the following ways:

- Important deer winter range needs to be identified as a part of project analysis;
- We must assure consideration of deer winter range in the environmental analysis process;
- Beach/estuary and riparian buffers, deferrals of harvest, and lighter silvicultural treatments are designed to protect important deer winter habitat;
- We are directed to maintain sufficient deer habitat to maintain sustainable wolf and deer harvests (generally 18 deer/sq. mile).

The following steps were taken to conserve deer habitat; all are consistent with the Forest Plan:

- 1) Important deer winter range has been identified by combining habitat models with historic and current field information (see Fig. Wild- 1).
- 2) Deer winter range was considered in the design of Old-growth Reserve alternatives (TLMP Reserve, Revised TLMP Reserve and the North Reserve), through concentration of

timber harvest in lower quality habitats, and through retaining forest structure within harvest units. All the reserve options contain benefits for deer. The TLMP and Revised TLMP Reserves contain more modeled high value winter range (see reserve discussion, Biodiversity section). The placement of the North Reserve leads to an increase in island-wide habitat capability over time, i.e. 26 deer/square mile versus 25 deer/square mile by the year 2095 (Table Wildlife-3).

Since earlier timber harvesting concentrated on the south and west side, aspects that are preferred by deer, we treat these areas lightly with this entry. Group selection, patch cut and reserve prescriptions will retain some forest structure and provide snow interception within harvest units.

3) Although some deer winter habitat areas will be harvested, many important areas are protected under the Forest Plan. Based on our models, nearly all high value habitat ($hsi \geq 0.67$) is retained within areas unsuitable for timber production for all alternatives (USDA Forest Service, 1997b; Table Wildlife-2).

4) Several changing variables make it difficult to predict the effects of this timber sale on deer densities. As one might expect due to the small land area, it appears that the Deer Island deer population goes through "boom and bust" cycles. These cycles can be affected by many factors, including lack of abundant summer range, effects of timber harvest, impacts of wolf predation and susceptibility to hunting. Based on our most recent model, deer habitat capability will remain sufficient in the future (Table Wildlife-3).

Table Wildlife-2 displays the effect of each alternative on high value habitat for deer and marten. *There are a number of ways to adjust the deer model to reflect retention, none of which have been tested. We chose one strategy for the DEIS and clearly defined our methods in the anticipation of public feedback. After receiving comments on the DEIS and talking to State biologists, we reran the deer model for the FEIS by creating a post-harvest volume layer. Using this strategy we do not manipulate HSI values but attempt to refine the input data (volume) going into the model. This results in no change in our results from the DEIS for effects on high value habitat (Table Wildlife-2) but slight changes (insignificant) in deer population numbers between the DEIS and FEIS (Table Wildlife-3).*

All alternatives are similar in their effects to high value deer winter range. Alternatives 5 and 6 have a slight measurable difference but we do not expect it to be significant.

Table Wildlife - 2 Percent of high value deer and marten habitats that remain unharvested by alternative with this entry

	Existing acres in VCU	% remaining Alt1	% remaining Alt2	% remaining Alt3	% remaining Alt4	% remaining Alt 5	% remaining Alt 6
Deer	336	100%	100%	100%	100%	98%	99%
Marten	1395	100%	79%	82%	83%	80%	92%

* High value habitat for marten is high volume strata below 1500' elevation.

Table Wildlife-3 displays habitat capability measured in number of deer for determining effects on subsistence and wolf populations. Under any alternative, deer habitat capability will remain over 30 deer/sq. mile with this project, which is sufficient habitat for meeting hunter needs and maintaining wolf populations. Under any alternative, deer habitat capability is at least 25 deer/square mile in the future. Placing the reserve on the north end of Deer

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Island (Alternatives 5 and 6) provides for more long-term habitat capability than leaving the reserve in its current location. Alternatives 2, 3, 4 and 6 retain varying amounts of structure within units, but create more openings than Alternative 5. Alternative 5 is designed to maintain old-growth forest structure, this first entry. It appears that the difference between the alternatives based on the deer model results are insignificant (Table Wildlife-3). We expect Alternative 5 to be the most responsive to the deer issue in this entry, followed by Alternative 6, 3, 4 and 2.

Table Wildlife - 3 Habitat capability in Deer/sq mile by alternative and for year 2095 for the VCU

	Alt1 (Existing)	Alt2	Alt3	Alt4	Alt5	Alt6	*Year 2095 with TLMP Reserve	*Year 2095 with TLMP Revised Reserve	*Year 2095 with North Reserve
# of Deer	490	464	468	466	460	475	368	368	396
Deer/sq mile	33	31	31	31	31	32	25	25	26

Marten

The Forest Plan identifies high value marten habitat as high-volume old-growth stands below 1500' in elevation. To meet Forest Plan Standards we will retain forest structure within harvest units that contain high value marten habitat by leaving at least seven large diameter trees per acre (see Fig. Wild-2). Table Wildlife-2 shows the effect on high value marten habitat by alternative. Alternatives 4, 5 and 6 are believed to provide marten with more security than alternatives 2 and 3 which have roads (Table Wildlife-4). Proposed roads will be closed after the sale but may still be used by hunters and trappers as foot-paths. Research on Chichagof Island indicates that a road density above 0.2 miles/sq mile can lead to increased mortality as a result of trapping. Alternative 6 concentrates harvesting in higher elevation habitats and has the least impact on high value marten habitat. Alternatives 4 and 5 appear to have similar effects when measured by our models, but Alternative 5 may have more benefits due to the amount of forest structure that will remain following this entry. We expect Alternatives 5 and 6 to be the most responsive to concerns for marten followed by Alternatives 4, 3 and 2.

Table Wildlife - 4 Road density by alternative for the Value Comparison Unit

Alternative	Road Density (miles road/sq mile)	Open Road Density (miles road/sq mile)
1	0	0
2	0.6	0
3	0.3	0
4	0	0
5	0	0
6	0	0

Effects on wolves

We have seen wolf sign in several areas and located an important use area on the north end of Deer Island (within the North Reserve Option). We are implementing all Forest Plan Standards for wolf habitat protection. It is unlikely that this island can support a pack due to its small size and animals probably travel to the mainland on a regular basis (D. Person, pers. comm). Nonroaded alternatives and those that retain the most deer winter range will do the most to benefit wolves. Alternatives 2 and 3 propose road development near an important wolf use area. All Forest Plan Standards and Guidelines will be followed for locating roads outside of wolf den buffers. Table Wildlife-4 displays road densities by alternative. All roads would be closed following harvest by removal of drainage structures (everything beyond mile post 2.0), placement of a gate near the LTF, removal of the LTF bulkhead, and a closure order prohibiting motorized use. Thus, open road density following harvest for all alternatives would 0 miles/square mile. Alternatives 4, 5 and 6 do not construct a road, making them more responsive to the wolf issue. All alternatives maintain habitat capability for over 18 deer/square mile (Table Wildlife-3) which will support a huntable deer population with predators. Alternative 5 is believed to be the most responsive to wolf concerns this entry, followed by Alternative 6, 4, 3 and 2.

Effects on songbirds, waterfowl, shorebirds, other raptors

The estuary buffer zones and placement of LTFs away from the estuaries should minimize most of the effects of timber harvest on waterfowl. Riparian buffers will protect habitat for nesting Vancouver Canada Geese and Harlequin Ducks. The wetlands that will be affected by roads do not appear to be of significant importance to large numbers of waterfowl. The beach buffer appears to receive a lot of use by songbirds, especially the brown creeper and this area along with other non-harvestable lands should maintain adequate habitat. Nest site protection and minimizing disturbance around nests will reduce the effect of all alternatives on raptors. The USF&WS and the Forest Service maintain an interagency agreement for bald eagle habitat management in the Alaska Region. All identified nests are surrounded by a 330 foot radius protective management zone. Helicopter activities for this sale will be restricted within 1/4 mile of active eagle nests.

Marbled Murrelet

Field surveys of probable nesting stands did not locate any murrelet nests or eggshell fragments. Any nests located during field reconnaissance or unit layout will be protected from timber harvest and blowdown under Forest Plan standards and guidelines. A 600-foot buffer is required around each known nest, with disturbance activities minimized during the nesting season, and the buffer zone would be maintained and monitored for at least two nesting seasons following discovery. If the nest remains inactive for more than two years, the buffer protection may be removed.

The Tongass conservation assessment for murrelets recommends developing reserves in low elevation areas that include streams and rivers. In addition, the Forest Plan recommends protection of old growth habitat near the heads of bays especially in aquatic or terrestrial concentration areas. Based on these recommendations, alternatives with the north reserve option should best benefit marbled murrelets.

Keens Myotis

Old-growth related structures that may be used by this species will be retained within the beach fringe and the old-growth reserves as well as within many of the harvest units. This timber sale may impact individuals or habitat but will not contribute to a trend towards Federal listing as threatened, endangered or sensitive, nor will it result in a loss of population viability.

Harlequin Duck and Spotted Frog

Riparian habitats along all potentially affected streams in the Project Area are protected under Forest Plan standards and guidelines for riparian areas, and habitat for these two species is

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expected to be maintained. We expect no significant effects on any waterfowl populations. The spotted frog is not likely to occur in the Project Area, and no effect on this species is anticipated under any alternative.

Olive-sided Flycatcher

Standing dead trees will be maintained within many of the harvest units. No adverse effects are expected for olive-sided flycatchers.

Other Environmental Considerations

Unavoidable Adverse Effects

Implementation of any action alternative would cause some adverse environmental effects that cannot be effectively mitigated or avoided. Unavoidable adverse effects often result from managing the land for one resource at the expense of the use or condition of other resources. Many adverse effects can be reduced, mitigated, or avoided by limiting the extent or duration of effects. The interdisciplinary procedure used to identify specific harvest units and roads was designed to eliminate or lessen the significant adverse consequences. The application of Forest Plan standards and guidelines, Best Management Practices, project-specific mitigation measures, and monitoring are all intended to further limit the extent, severity, and duration of potential effects. Such measures are discussed throughout this chapter. Regardless of the use of these measures, some adverse effects will occur. The purpose of this EIS is to fully disclose these effects.

Air quality would diminish on a recurring, temporary basis due to the construction of roads, timber harvest, and hauling. Limbs and logging slash would be burned at sort yards intermittently throughout the logging periods, depositing minor amounts of particulate matter and smoke into the air.

Although Best Management Practices are designed to protect soil and water, some potential for surface erosion, sediment production, channel erosion, and mass movement does exist. Road development poses a risk of sediment production, while helicopter yarding reduces this risk considerably. Sediment production could displace fish or result in a loss of habitat near stream crossings and temporarily affect the function of the freshwater system.

Increased human activity both during and after logging, and loss of habitat, would result in impacts to fish and wildlife species, particularly those populations that have low numbers or are more sensitive to the presence of people. The habitat for old growth associated species would be reduced.

Although the degree of impact varies with the alternative selected, logging operations would temporarily affect the use of the area by guides, commercial fishermen, tourists, and local recreationists. There would also be some loss of primitive and semi-primitive recreation opportunities in the project area. The natural landscape, as viewed from Ernest Sound and Seward Passage, would appear visually altered and may be noticeable to viewers.

Irreversible Commitments

Irreversible commitments are decisions affecting non-renewable resources such as soils, wetlands, unroaded areas, and cultural resources. Such commitments are considered irreversible because the resource has deteriorated to the point that renewal can occur only over a long period of time or at a great expense, or because the resource has been destroyed or removed.

The construction of roads, to provide access to the Forest, is an irreversible action because of the time it takes for a constructed road to revert to natural conditions. Irreversible actions also include the associated rock quarries which are developed in conjunction with these roads. Alternatives 1, 4, 5 and 6 would have no new road construction, while Alternative 2 would construct 9.4 miles and Alternative 3 would construct 4.1 miles of new road. Under the worst-case assumption that the roads will commit a 75-foot-wide corridor, Alternative 2 would require up to 85 acres and Alternative 3 would require up to 37 acres of ground to be irreversibly committed to roads, landings and rock quarries.

The majority of Deer Island is included in the Frosty Roadless Area (210). There is approximately 6405 acres classified as roadless on Deer Island, as identified in the Forest

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Plan FEIS (USDA Forest Service, 1997a) that might be affected by the Kuakan Project. A decision to develop this roadless area would mean that its primitive character in terms of opportunities for solitude, remoteness and development of wilderness skills would irreversibly be gone.

Old-growth habitat lost due to logging could be considered an irreversible effect since it is not expected to regain old-growth characteristics for at least 200 years. Alternative 5 would retain enough residual old-growth (65-75%) to still be classified as old-growth following this initial entry, thus deferring the loss of old-growth until the next entry. Alternatives 2, 3, 4 and 6 would harvest between 456 and 689 acres of productive old-growth.

Loss of soil due to erosion and mass failures is an irreversible commitment. However, due to the incorporation of Best Management Practices (BMPs), Forest Plan standards and guidelines, and mitigation measures specified in this document, it is not anticipated that there would be any significant soil loss under any alternative.

Loss of cultural resource sites resulting from accidental damage or vandalism would be an irreversible commitment of resources. The standards and guidelines, survey methodology prior to activities, and mitigation measures specified in this document provide reasonable assurance that there would be no irreversible loss of cultural resources.

Irretrievable Commitments

Irretrievable commitments represent opportunities foregone for the period during which resource use or production cannot be realized. Such decisions are reversible, but the production opportunities foregone are irretrievable.

The reduction in the visual quality of an area because of timber harvesting will be an irretrievable commitment of resources. The commitment is considered irretrievable since viewsheds will typically heal from a visual quality standpoint after about 40 years. After this time, the second-growth trees will have the color and height needed so as not to be evident to the casual observer. Alternative 1 will have no irretrievable commitment of visual quality. Alternative 5 would likely have a minimal irretrievable commitment of visual quality due to the high retention of old-growth within each unit. Alternatives 2, 3, 4 and 6 would irretrievably commit visual resources because of timber harvesting (see Scenery in Chapter 3).

Changes to the TLMP designated Old-growth Reserve would result in an irretrievable commitment of resources. The opportunity to produce timber from otherwise suitable productive old-growth (POG) is forgone during the life of the Forest Plan. The TLMP Reserve commits 416 of otherwise suitable POG to Old-growth Reserve. The Modified TLMP Reserve (in Alternatives 2, 3 and 4) commits 358 acres of otherwise suitable POG to Old-growth Reserve. The North Reserve (in Alternatives 5 and 6) commits 655 acres of otherwise suitable POG to Old-growth Reserve (see Biodiversity in Chapter 3).

Short-term Use and Long-term Productivity

Short-term uses and their effects are those that occur annually or within the first few years of project implementation. Long-term productivity refers to the capability of the land and resources to continue producing goods and services long after the project has been implemented. Under the Multiple Use-Sustained Yield Act, and the National Forest Management Act, all renewable resources are to be managed in such a way that they are available for future generations. The harvesting and use of standing timber can be considered a short-term use of a renewable resource. As a renewable resource, trees can be reestablished and grown again if the long-term productivity of the land is maintained. This long-term productivity is maintained through the application of the resource protection measures just described, in particular those applying to the soil and water resources. These are also discussed throughout the chapter.

Possible Conflict with Plans and Policies of Other Jurisdictions

The CEQ regulations implementing NEPA require a determination of possible conflicts between the proposed action and the objectives of Federal, State, and local land use plans, policies, and controls for the area. The major land use regulations of concern are Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA), the Coastal Zone Management Act (CZMA), and the State of Alaska's Forest Practices Act.

Alaska National Interest Lands Conservation Act of 1980 (ANILCA)

Under Section 810 of ANILCA, agencies are required to evaluate the effects of proposed actions on subsistence uses of Federal land and to determine if the proposed action may significantly restrict subsistence opportunities. Refer to the Subsistence section of this chapter for the evaluation of impacts to subsistence use a result of the alternatives.

Coastal Zone Management Act of 1976 (CZMA)

The CZMA was passed by Congress in 1976 and amended in 1990. This law requires federal agencies conducting activities or undertaking development affecting the coastal zone to ensure that the activities or developments are consistent with approved state coastal management programs to the maximum extent practicable. The State of Alaska passed the Alaska Coastal Management Act in 1977, to establish a program that meets the requirements of the CZMA. It contains the standards and criteria for determining consistency for activities within the coastal zone.

The consistency evaluation will consider: Alaska Statute Title 46, Water, Air Energy, and Environmental Conservation; and the Alaska Forest Practices Act of 1990.

The Forest Service has designed all alternatives to ensure that the activities and developments affecting the coastal zone are consistent with approved coastal management programs to the maximum extent practicable. The standards and guidelines for timber management activities in the project area meet or exceed those indicated in the Alaska Forest Practices Act and the ACMP.

Evaluating the proposed activities against the enforceable policies for activities within the coastal zone results in a finding that these activities are consistent with the ACMP to the maximum extent practicable. The State of Alaska Division of Governmental Coordination completed their consistency review of the Kuakan project, and concurred with the Forest Service finding on August 23, 1999.

State of Alaska's Forest Practices Act of 1990

In 1990 the State passed a revised Alaska Forest Practices Act. For federal timber sales, the Forest Practices Act provides the standards to be used for a determination of consistency with the Alaska Coastal Management Act. It also provides specific stream buffer requirements.

The Forest Plan standards and guidelines, and management practices, incorporated into the Kuakan Project meet or exceed those indicated by the Alaska Coastal Management Act and the Alaska Forest Practices Act. The design of all proposed harvest units complies with Forest Plan standards and guidelines for riparian areas, which meet or exceed the stream buffer requirements in the Forest Practices Act.

Energy Requirements and Conservation Potential of Alternatives

The implementation of the proposed activities in the Project Area will require the expenditure of energy (consumption of fuel). The amount of energy used varies by alternative based on timber volume harvested and miles of road constructed. The direct effect of the alternatives on energy requirements would be attributed to timber harvest, road construction and travel necessary to administer the timber sale. Indirect energy requirements include processing wood products and the transport of the products to secondary processors and consumers.

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The estimated total fuel consumption required for each alternative is displayed in Table Fuel-1

Table Fuel - 1 Fuel Consumption by Alternative

	Gallons /MBF	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Sale Prep & Admin.	1.5	0	23,400	15,750	22,500	18,150	15,450
Cable logging	2	0	17,400	5,800	0	0	0
Heli logging	8	0	55,200	60,800	120,000	96,800	82,400
Haul, Dump & Tow	8	0	124,000	84,000	120,000	96,800	82,400
Road Construct	4,000/mi	0	37,440	16,560	0	0	0
Road Maint.	20/mi	0	40	40	0	0	0
Total Gallons		0	257,480	182,950	262,500	211,750	180,250
Average/MBF		0	16.5	17.4	17.5	17.5	17.5

Natural or Depletable Resource Requirements and Conservation Potential of Alternatives

All alternatives considered in detail are designed to conform to applicable laws and regulations pertaining to natural or depletable resources, including minerals and energy resources. Regulation of mineral and energy activities on the National Forest, under the U.S. Mining Laws Act of 1872 and the Mineral Leasing Act of 1920, is shared with the Bureau of land Management (BLM). The demand for access to National Forest system lands for the purpose of mineral and energy exploration and development is expected to increase over time.

Two of the action alternatives propose road construction that will increase opportunities for access to the National Forest within the Project Area. This increased access may result in increased activity with regard to potential mineral or energy resource occurrences. There are no known mineral or energy resources in the Project Area.

Urban Quality, Historic and Cultural Resources, and the Design of the Built Environment

The Project Area contains no urban areas. Therefore, the only applicable concern under this topic is with historic and cultural resources. The goal of the Forest Service's Cultural Resource Management Program is to preserve significant cultural resources in their field setting and ensure they remain available in the future for research, social/cultural purposes, recreation, and education. The direct, indirect, and cumulative effects of the alternatives on cultural resources have been evaluated. The results of this evaluation is the determination that there are adequate standards, guidelines, and procedures to protect cultural resources and to meet the goals of the Cultural Resources Management Program. Cultural resources are discussed further in the Heritage section of this chapter.

Effects of Alternatives on Consumers, Civil Rights, Minorities, and Women

All Forest Service actions have the potential to produce some form of impact, positive and/or negative, on the civil rights of individuals or groups, including minorities and women. The need to conduct an analysis of this potential impact is required by Forest Service Manual and Forest Service Handbook direction. The purpose of the impact analysis is to determine the scope, intensity, duration and direction of impacts resulting from a proposed action. For environmental or natural resource actions, such as proposed for the Project Area, the civil rights impact analysis is an integral part of the procedures and variables associated with the

social impact analysis. This analysis is discussed in the Socioeconomic section of this chapter.

The effects of the alternatives on consumers is reflected in the discussion of the various goods and services supplied as a result of the proposed alternatives. This analysis occurs throughout the chapter as an integral part of the analysis of the effects on other components of the environment. We have determined that the actions proposed in the alternatives would not adversely affect consumers, civil rights, women or minorities.

Effects of Alternatives on Prime Farmland, Rangeland, and Forest Land

All alternatives are in keeping with the intent of Secretary of agriculture Memorandum 1827 for prime land. The Project Area does not contain any prime farmlands or rangelands. Prime forest land does not apply to lands within the National Forest System. In all alternatives, lands administered by the Forest Service would be managed with a sensitivity to the effects on adjacent lands.

Chapter 4

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Steve Connelly	John Jensen	Helen Stokes
Dick Coose	Don & Terry Johnson	James Stough
Luke & Linda Cramer	Merrily Jones	Pat Tagart
David Crown	Jerry Kilanowski	Senator Robin Taylor
Phil Cruz	David King	Patricia Torsen
Mr. & Mrs. Jam Denison	Bernie Klemanek	Bill Tremblay
Michael Dixon	Steve Kramer	Coral Tsegi
Ken Dorman	Richard Lampe	Edward R. Ule
Norma Jean Dunne	Eric Lie-Nielsen	John Vowell
Bruce Eagle	Enid Magill	Frank Warfel Sr.
Larry Edwards	David McFadden	Winifred O. Weber
Frank Erridge	Michael Medalen	Marc Wheeler
Sylvia Ettefaugh	Ira & Lucille Merrill	
Gene Feind	Jackie Moore	

Agencies and Organizations Sent a Copy of the Final EIS

ADF&G Habitat Division (Jim Cariello)	Alaska Natural Heritage Program (Julia Lenz)
ADF&G Division of Sports Fish (Dean Beers)	Alaska Natural Heritage Program (Scott Wilbor)
ADNR - Lands (Regional Manager)	Alaska Pacific Trading Co. (Dick Tsuru)
ADNR - Division of Forestry (Jim McAllister)	Alaska Public Radio Network
Alaska Dept of Environmental Conservation (Jim Ferguson)	Alaska Rainforest Campaign
ADF&G (Glen Freeman)	Alaska State Library (Publications Government)
ADF&G (Phil Mooney)	Alaska Waters, Inc. (James Leslie)
ADF&G (Tom Paul)	Alaska Women in Trees (Joan Kautzer)
ADF&G (Mike Turek)	Animal and Plant Health Inspection Service
Advisory Council on Historic Preservation	Aqua Sports Enterprise (Terry Bunes)
AK Div. of Government Coordination (Karen Essary)	Backcountry Adventures (Frank Heller)
Alaska Forest Association	c/o The Chicago Greens (Lionel P. Trepanier)

Lists 4

Campbell Towing (Carl Campbell)	Robertson, Monagle & Eastaugh (Terry Thurbon)
Cascade Culvert, Inc. (Leslie Koontz)	Robertson, Mongale & Eastaugh (Ruth Hamilton)
Cascadia Wildlands Project (Gabriel Scott)	Rural Development Administration
Chilkoot Lumber Co., Inc.	SEACC (Buck Lindekugel)
City of Wrangell (Carol Rushmore)	SEACC (Peggy Wilcox)
City of Kake (Lonnie Anderson)	Sealaska Corporation (Robert W. Loescher)
Concerned Citizens 4 Wise Use (Richard Uberuaga)	Sealaska Timber Corporation (Fred Jorgensen)
Dames & Moore (David Every)	Seley Corporation (Tim Droke)
Division of Air and Water Quality (Kevin Hanley)	SENSC (Harold Martin)
Earthjustice Legal Defense (Tom Waldo)	Sequoia Associates (Lou Keller)
ENSR (Information Center)	Sierra Club Anchorage Group (Jack Hession)
Environmental Protection Agency (Coordinator, EIS Review)	Sierra Club Auke Bay Group (Righard Hellard)
Federal Aviation Administration 2	Silver Bay Logging Company (Glenn Vantrease)
Federal Highway Administration	Silver Bay Logging Company (George Woodbury)
FERC Environmental Compliance	Soil Conservation Service
Forest Dwellers (Joseph Sebastian)	Southeast Alaska Wood Products (Edwin Brauer)
Forest Gaurdians (John Talberth)	Southeast Exposure (Betsey Burdett)
Forest Sciences Laboratory (Robert Schroeder)	Stickeen Wilderness Adventures (Todd Harding)
Foster Wheeler Environ Corp. (Tom Stewart)	Sunnyside School (Laurie Espinoza)
FSEEE (Andy Stahl)	SWCBD (Kathy Siegel)
Glacier Energy Ltd. (Ernie Eads)	UAF- Coop. Ext. Service (Bob Gorman)
Haines Enterprises (William D. Haines)	US Army Corps of Engineers (Mike Holley)
Hancock Timber Resource Group (David Kimbrough)	US Army Corps of Engineers (Glen Justis)
Hook & Eye Charters (Sean Reilly)	US Army Corps of Engineers (Ralph Thompson)
Kadin Corporation	US Coast Guard, Environmental 1
Kake Corporation	US Department of Transportation
Kake Area Conservation Council (Leo & Mary Ann Kondro)	US Department of Housing and Urban Development
Kake Tribal Heritage Foundation	US EPA (Steve Torok)
Kake Tribal Logging & Timber Co. (Pat Joensuu)	US EPA, Office of Federal Activities (Pearl Young)
KCAW-FM, Raven Radio (News Director)	US EPA, Alaska Operations (Mark Jen)
Ketchikan Gateway Borough	US Fish & Wildlife Service (Carol Hale)
Ketchikan Pulp Company (Kent Nicholson)	US Fish & Wildlife Service (Julee Beasley)
Ketchikan Pulp Corporation (Jill Bennett)	US Fish & Wildlife Service (Subsistence Management)
Ketchikan Sports & Wildlife	US Fish & Wildlife Service (Susan Walker)
KFSK Public Radio, News Department	US Naval Observatory 2
KSTK Public Radio, News Department	US Navy, Chief of Navy Operations
KCAW Raven Radio, News Department	USDA Forest Service (Chief, 1950)
Landau Associates (Dale Stirling)	USDA Forest Service (Fred Clark)
Maple Leaf Adventures, Inc. (Brian Falconer)	USDA Forest Service (Karryl Krieger)
Monographs Acquisition Services (Judy Smith)	USDA Forest Service (Larry Lunde)
Narrows Conservation Coalition	USDA Forest Service (Regional Forester)
Narrows Conservation Coalition (Dave Beebe)	USDA Forest Service - Sitka Ranger District (Bill Lorenz)
National Bank of Alaska	USDA National Agricultural Library
National Marine Fisheries Service (Steven Zimmerman)	USDA OPA Publications Stockroom
National Park Service (Jack Mosby)	USDA Office of Equal Opportunity (William Goggins)
Native Forest Network	Utah State University (Carla Heister)
Natural Resources Defense Council (Nathaniel Lawrence)	Walt Sheridan & Associates
NOAA Ecology and Conservation Division	Wesley Rickard, Inc. (Lesa Berdoy)
Northern Ventures (Chad Smith)	Wilderness Society (Nicole Whittington)
Office of Environmental Affairs-16/8	Wilderness Watch (George Nickas)
Olive Cove Homeowner's Association (Donna Rice)	Woodbury Enterprises
Organized Village of Kake (Mike Jackson)	Wrangell Chamber of Commerce
Paden Timber Services (Ronald L. Paden)	Wrangell Cooperative Association
Petersburg Pilot, Editor	Wrangell Resource Council (Joel Hanson)
Ried Brothers Logging & Construction (Alex Reid)	Wrangell Sentinel, Editor

Glossary

Access

The opportunity to approach, enter, and make use of public lands.

Access Management

Acquiring rights and developing and maintaining facilities needed by people to get to and move through public lands (physical attributes).

Adaptive Management

A continuous process of action-based planning, monitoring, research, evaluation, and adjustment with the objective of improving implementation and achieving desired management goals and objectives.

Alaska National Interest Lands Conservation Act (ANILCA)

Passed by Congress in 1980, this legislation designated 14 National Forest wilderness areas in Southeast Alaska. The Alaska National Interest Lands Conservation Act of December 2, 1980. Public Law 96-487, 96th Congress, 94 Stat. 2371-2551. In Section 810 requires evaluations of subsistence impacts before changing the use of these lands.

Alaska Native Claims Settlement Act (ANCSA)

Public Law 92-203, 92nd Congress, 85 Stat. 2371-2551. Approved December 18, 1971, ANCSA provides for the settlement of certain land claims of Alaska natives and for other purposes.

Allowable Sale Quantity (ASQ)

ASQ refers to the maximum quantity of timber that may be sold each decade from the Tongass National Forest. This quantity, expressed as a board foot measure, is calculated per timber utilization standards specified in the Alaska Regional Guide, the number and type of acres available for timber management, and the intensity of timber management. The ASQ was calculated at 4.5 billion board feet per decade for the Tongass National Forest.

Alluvial Fan

A cone-shaped deposit of organic and mineral material made by a stream where it runs out onto a level plain or meets a slower stream.

Alluvium

Material deposited by rivers or streams, including the sediment laid down in river beds, floodplains and at the foot of mountain slopes and estuaries.

Alpine

Parts of mountains above tree growth and/or the organisms living there.

Alternative

One of several policies, plans, or projects proposed for decision making.

Anadromous Fish

Anadromous fish (such as salmon, steelhead, and sea run cutthroat trout) spend part of their lives in freshwater and part of their lives in saltwater.

Background

The distant part of a landscape. The seen or viewed area located from three or five miles to infinity from the viewer. (See "Foreground" and "Middleground".)

Beach Fringe

The area inland from salt water shorelines, which is typically forested.

Bedload

Sand, silt, and gravel, or soil and rock debris rolled along the bottom of a stream by the moving water.

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Best Management Practice (BMP)

Land management methods, measures, or practices intended to minimize or reduce water pollution. Usually BMPs are applied as a system of practices rather than a single practice. BMPs are selected on the basis of site-specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility.

Biological Diversity (Biodiversity)

The variety of life in all its forms and at all levels. This includes the various kinds and combinations of: genes; species of plants, animals, and microorganisms; populations; communities; and ecosystems. It also includes the physical and ecological processes that allow all levels to interact and survive. The most familiar level of biological diversity is the species level, which is the number and abundance of plants, animals, and microorganisms.

Blowdown

See windthrow.

Board Foot (BF)

A unit of wood 12" X 12" X 1". One acre of commercial timber in Southeast Alaska on the average yields 28,000-34,000 board feet per acre (ranging from 8,000-90,000 board feet per acre). One million board feet (MMBF) would be the volume of wood covering one acre two feet thick. One million board feet yields approximately enough timber to build 120 houses or 75,555 pounds of dissolving pulp.

Brush Disposal

Cleanup and disposal of slash and other hazardous fuels within the forest or project areas.

Buffer

An area around a resource where timber harvest is restricted or prohibited. For example, the Tongass Timber Reform Act (TTRA) requires that timber harvest be prohibited in an area no less than 100 feet on each side of all Class I streams and Class II streams which flow directly into Class I streams. This 100-foot area is known as a "stream buffer".

Capability

An evaluation of a resource's inherent potential for use.

Clearcut

The harvesting in one cut of all trees on an area. The area harvested may be a patch, strip, or stand large enough to be mapped or recorded as a separate class in planning for sustained yield. Clearcut size on the Tongass National Forest is limited to 100 acres, except for specific conditions noted in the Alaska Regional Guide.

Code of Federal Regulations (CFR)

A codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the Federal Government.

Commercial Fishery

Fish, shellfish, or other fishery resources taken or processed within a designated area for commercial purposes

Commercial Forest Land (CFL)

Productive Forest and that is producing or capable of producing crops of industrial wood and is not withdrawn from timber utilization by statute or administrative regulation. This includes areas suitable for management and generally capable of producing in excess of 20 cubic feet per acre of annual growth or in excess of 8,000 board feet net volume per acre. It includes accessible and inaccessible areas.

Normal CFL: Timber that can be economically harvested with locally available logging systems. Composed of two categories:

Standard: Timber that can be economically harvested with locally available logging systems, such as highlead or short-span skyline.

Special: Timber that is in areas where special consideration is needed to protect other resources but can be harvested with locally available logging systems.

Non-standard CFL: Timber that cannot be harvested with locally available logging systems and would require the use of other logging systems such as helicopter or long-span skyline.

Confluence

The point where two streams meet.

Connectivity

A measure of the extent that forest areas between or outside reserves provide habitat for breeding, feeding, dispersal, and movement.

Corridor

Connective links of certain types of vegetation between patches of suitable habitat which are necessary for certain species to facilitate movement of individuals between patches of suitable habitat. Also refers to transportation or utility rights-of-way.

Cover

Refers to trees, shrubs, or other landscape features that allow an animal to partly or fully conceal itself.

Critical Habitat

Specific terrain within the geographical area occupied by threatened or endangered species. Physical and biological features that are essential to conservation of the species and which may require special management considerations or protection are found in these areas.

Crown

The tree canopy. The upper part of a tree or woody plant that carries the main branch system and foliage.

Cruise

Refers to the general activity of determining timber volumes and quality as opposed to a specific method.

Cultural Resources

See Heritage Resources.

Cumulative Effects

The impacts on the environment resulting from additional incremental impacts of past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions occurring over time.

Diameter Breast Height (DBH)

The diameter of a tree measured 4 feet 6 inches from the ground.

Debris Avalanche

The sudden movement downslope of the soil mantle on steep slopes. Complete saturation of the soil from prolonged heavy rains is one factor. Also known as a debris slide.

Debris Torrents

Landslides that occur as a result of debris; avalanche materials which either dam a channel temporarily or accumulate behind temporary obstructions such as logs and forest debris.

Deer Winter Range

A combination of environmental elements that support Sitka black-tailed deer under moderately severe or severe winter conditions. Usually associated with high volume old-growth stands at low elevations and south aspects.

Developed Recreation

Recreation that requires facilities that, in turn, result in concentrated use of an area. Facilities in these areas might include roads, parking lots, picnic tables, toilets, drinking water, and buildings.

Direct Employment

Jobs that are immediately associated with a timber sale, including, for example, logging, sawmills, and pulpmills.

Dispersal

The movement, usually one way, of plants and animals from their point of origin to another location where they subsequently produce offspring.

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Distance Zone

Areas of landscapes denoted by specified distances from the observer (foreground, middleground, or background). Used as a frame of reference in which to discuss landscape characteristics of management activities.

Diversity

The distribution and abundance of different plant and animal communities and species within the area controlled by the Forest Plan.

Draft Environmental Impact Statement (DEIS)

A statement of environmental effects for a major Federal action which is released to the public and other agencies for comment and review prior to a final management decision. Required by Section 102 of the National Environmental Policy Act (NEPA).

Eagle Nest Tree Buffer Zone

A 330-foot radius around eagle nest trees established in an Agreement between the U.S. Fish and Wildlife Service and the Forest Service.

Ecological Province

Twenty-one ecological subdivisions of Southeast Alaska that are identified by generally distinct ecological, physiographic, and biogeographic features. Plant and animal species composition, climate, and geology within each province are generally more similar within than among adjacent provinces. Historical events (such as glaciers and uplifting) are important to the nature of the province and to the barriers that distinguish each province.

Ecosystem

A community of organisms and its physical setting. An ecosystem, whether a fallen log or an entire watershed, includes resident organisms, non-living components such as soil nutrients, inputs such as rainfall, and outputs such as organisms that disperse to other ecosystems.

Effects

Effects, impacts, and consequences as used in this environmental impact statement are synonymous. Effects may be ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historical, cultural, economic, or social, and may be direct, indirect, or cumulative.

Direct Effects: Results of an action occurring when and where the action takes place.

Indirect Effects: Results of an action occurring at a location other than where the action takes place and/or later in time, but in the reasonably foreseeable future.

Cumulative Effects: See Cumulative Effects.

Endangered Species

Any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range. Plant or animal species identified by the Secretary of the Interior as endangered in accordance with the 1973 Endangered Species Act. See also, threatened species, sensitive species.

Endemic

Restricted to a particular locality. For example, a particular species or subspecies may occur on only one or a very few islands.

Estuary

For the purpose of this EIS process, estuary refers to the relatively flat, intertidal, and upland areas generally found at the heads of bays and mouths of streams. They are predominately mud and grass flats and are unforested except for scattered spruce or cottonwood.

Even-Aged Stand Management

The application of a combination of actions that result in the creation of stands in which trees of essentially the same age grow together. The difference in age between trees in forming the main canopy level of a stand usually does not exceed 20 percent of that age of the stand at harvest rotation age. Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands.

Executive Order

An order or regulation issued by the President or some administrative authority under his or her direction.

Fen

A tract of low, wet ground containing sedge peat, relatively rich in mineral salts, alkaline in reaction, and characterized by slowly flowing water. Unlike peatlands (commonly referred to as bogs or muskegs), fens contribute to stable stream flows, provide nutrient input to streams and often contribute to fish rearing habitat.

Final Environmental Impact Statement (FEIS)

The final version of the statement of environmental effects required for major federal actions under Section 102 of the National Environmental Policy Act. It is a revision of the draft environmental impact statement (DEIS) to include public and agency responses to the draft. The decision maker chooses which alternative to select from the Final EIS, and subsequently issues a Record of Decision (ROD).

Floodplain

That portion of a river valley, adjacent to the river channel, which is covered with water when the river overflows its banks at flood stages.

Forbs

Herbaceous plants; generally smaller flowering plants. Not included in the grass, shrub or tree categories.

Foreground

The stand of trees immediately adjacent to a scenic area, recreation facility, or forest highway; area located less than 1/4 mile from the viewer. See also, Background and Middleground.

Forest and Rangeland Renewable Resources Planning Act of 1976 (RPA)

Amended in 1976 by the National Forest Management Act. See RPA Assessment and Program.

Forest or Forest Land

National Forest lands currently supporting or capable of supporting forests at a density of 10 percent crown closure or better. Includes all areas with forest cover, including old growth and second growth, and both commercial and non-commercial forest land.

Forested Habitat

All areas with forest cover. Used in this EIS to represent a general habitat zone.

Forested Wetland

A wetland whose vegetation is characterized by an overstory of trees that are 20 feet or taller.

Forest Plan

The Tongass Land Management Revision, signed in 1997. This is the 10-year land allocation plan for the Tongass National Forest that directs and coordinates planning, the daily uses, and the activities carried out within the forest.

Fragmentation

An element of biological diversity that describes the natural condition of habitats in terms of the size of discrete habitat blocks or patches, their distribution, the extent to which they are interconnected, and the effects of management on these natural conditions. Also the process of reducing the size and connectivity of stands within a forest.

FSH

Forest Service Handbook.

FSM

Forest Service Manual.

Geographic Information System (GIS)

An information processing technology to input, store, manipulate, analyze, and display spatial and attribute data to support the decision-making process. It is a system of computer maps with corresponding site specific information that can be electronically combined to provide reports and maps.

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Group Selection

Small groups of trees up to 2 acres in size are harvested.

Guideline

A preferred or advisable course of action or level of attainment designed to promote achievement of goals and objectives.

Habitat

The sum total of environmental conditions of a specific place occupied by an organism, population, or community of plants and animals.

Habitat Capability

The estimated number of healthy animals that a habitat can sustain. Often shown as a relative percentage of optimum habitat conditions.

Habitat Suitability Index

This is a value assigned to a unit of land using a computerized model that relates vegetative and geographic characteristic (e.g. stand volume, proximity to a stream or cliff, slope, aspect, etc.) to the land unit's value for a particular wildlife species. Values generally range from 0 to 1, with 1 being the best. The Habitat Capability Models used to generate HSIs were developed by interagency teams of biologists using the best available information including research results and best professional judgement.

Haul out

An area of large, smooth rocks used by seals and sea lions for resting and pupping.

Heritage Resources

Also known as Cultural Resources. Historic or prehistoric objects, sites, buildings, structures, and their remains, resulting from past human activities.

Important Subsistence Use Area

Important Subsistence Use Areas include the "most -reliable" and "most often hunted" categories from the TRUCS survey and from subsistence survey data from ADFG, the University of Alaska, and the Forest Service, Region 10. Important use areas include both intensive and extensive use areas for subsistence harvest of deer, furbearers, and salmon.

Indirect Employment

The jobs in service industries that are associated with a timber sale including, for example, suppliers of logging and milling equipment.

Infrastructure

The facilities, utilities, and transportation systems needed to meet public and administrative needs.

Inoperable Timber

Timber that cannot be harvested by any proven method because of potential resource damage, extremely adverse economic considerations, or physical limitations.

Interdisciplinary Team (IDT)

Two or more natural resource planners who use relevant information to develop alternative design and comparison for a proposed project. The team insures that integrated use of environmental, social, and economic information is clearly presented so the best decision can be made.

Intermediate Stand Treatments

A stand management treatment which manipulates stand growth, composition, structure, or tree quality. Intermediate treatments include thinning, pruning, clearing, weeding, liberation, release, improvement, salvage, and sanitation cutting to achieve different management objectives. These stand treatments do not attempt to obtain new tree regeneration, and they occur before the final regeneration harvest. Some treatments such as salvage cutting or commercial thinning result in the harvest of forest products.

Invertebrates

Animals without a backbone.

Irretrievable Commitments

Losses of production or use of renewable natural resources for a period of time. For example, timber production from an area is irretrievably lost during the time an area is allocated to a no-harvest prescription; if the allocation is changed to allow timber harvest, timber production can be resumed. The production lost is irretrievable, but is not irreversible.

Irreversible Commitments

Decisions causing changes which cannot be reversed. For example, if a roadless area is allocated to allow timber harvest and timber is actually harvested, that area cannot, at a later date, be allocated to wilderness. Once harvested, the ability of that area to meet wilderness criteria has been irreversibly lost. Often applies to nonrenewable resources such as minerals and cultural resources.

Issue

A point, matter, or section of public discussion or interest to be addressed or decided.

Knutsen-Vandenburg Fund (KV)

The portion of timber sale receipts collected and used for reforestation and other renewable resource projects on the sale area.

Landslides

The moderately rapid to rapid down slope movement of soil and rock materials that may or may not be water-saturated.

Log Transfer Facility (LTF)

A facility that is used for transferring commercially harvested logs to and from a vessel or log raft, or the formation of a log raft. It is wholly or partially constructed in waters of the United States and location and construction are regulated by the 1987 Amendments to the Clean Water Act. Formerly termed "terminal transfer facility" or "log dump".

Logging Systems

Cable: Ground based yarding of logs using a steel cable to pull logs to a landing.

Helicopter: Flight path cannot exceed 40 percent downhill or 30 percent uphill; landings must be selected so there is adequate room for the operation and so that the helicopter can make an upwind approach to the drop zone.

MBF

A thousand board feet net sawlog and utility volume.

MMBF

A million board feet net sawlog and utility volume.

Management Indicator Species (MIS)

Species selected in a planning process that are used to monitor the effects of planned management activities on viable populations of wildlife and fish..

Management Prescriptions

Method of classifying land uses presented in the Forest Plan. Replaces the Land Use Designations (LUDs) originally presented in TLMP.

Market Pond Value

Also known as pond log value. Selling value minus manufacturing costs. Pond log values are the price a timber buyer would pay for a log at the mill site.

Mass Movement

The downslope movement of a block or mass of soil. This usually occurs under conditions of high-soil moisture and does not include individual soil particles displaced as surface erosion.

Maritime Climate

Weather conditions controlled by an oceanic environment characterized by small annual temperature ranges and high precipitation.

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Memorandum of Understanding (MOU)

A legal agreement between the Forest Service and others agencies resulting from consultation between agencies that states specific measures the agencies will follow to accomplish a large or complex project. A memorandum of understanding is not a fund obligating document.

Middleground

The visible terrain beyond the foreground where individual trees are still visible but do not stand out distinctly for the landscape; area located from 1/4 to 5 miles from the viewer. See also, Foreground and Background.

Mineral Soils

Soils consisting predominately of, and having its properties determined by, mineral material.

Minimum Viable Population

A population with the estimated numbers and distribution of reproductive individuals to maintain the population over time.

Mitigation

Measures designed to counteract environmental impacts or to make impacts less severe. These may include: avoiding an impact by not taking a certain action or part of an action; minimizing an impact by limiting the degree or magnitude of an action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or compensating for the impact by replacing or providing substitute resources.

Mixed Conifer

In Southeast Alaska, mixed conifer stands usually consist of western hemlock, mountain hemlock, Alaska yellowcedar, Western redcedar, and Sitka spruce species. Shorepine may occasionally be present.

Model

A representation of reality used to describe, analyze, or understand a particular concept. A model may be a relatively simple qualitative description of a system or organization, or a highly abstract set of mathematical equations. A model has limits to its effectiveness, and is used as one of several tools to analyze a problem.

Monitoring

A process of collecting information to evaluate whether or not objectives of a project and its mitigation plan are being realized. Monitoring can occur at different levels: to confirm whether mitigation measures were carried out in the manner called for, to determine whether the mitigation measures were effective, or to validate whether overall goals and objectives were appropriate. Different levels call for different methods of monitoring.

Multiple-aged Stands

An intermediate form of stand structure between even and uneven-aged stands. These stands generally have two or three distinct tree canopy levels occurring within a single stand.

Multiple Entry

More than one stand or land treatment activity during a rotation of a stand or area.

Multiple Use

The management of all the various renewable resources of the National Forest System to be used in the combination that will best met the needs of the American people.

Muskeg

In Southeast Alaska a type of bog that has developed over thousands of years in depressions or flat areas on gentle to steep slopes. Also called peatlands.

National Environmental Policy Act (NEPA) of 1969

An Act to declare a national policy which will encourage productive and enjoyable harmony between humankind and the environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, to enrich the understanding of the ecological systems and natural resources important to the Nation, and to establish a Council on Environmental Quality (The Principal Laws Relating to Forest Service Activities, agric. Handb. 453. USDA Forest Service, 359 p.).

National Forest Management Act (NFMA)

A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act requiring the preparation of Regional Guides and Forest Plans and the preparation of regulations to guide that development.

National Wild and Scenic River System

Rivers with outstanding scenic, recreational, geological, fish and wildlife, historic, cultural, or other similar values designated by Congress under the Wild and Scenic Rivers Act of 1968 and amended in 1986, for preservation of their free-flowing condition. May be classified and administered under one or more of the following categories: Wild, Scenic, and/or Recreational.

Net Sawlog Volume

Tree or log volume suitable in size and quality to be processed into lumber. In Southeast Alaska, depending on the market, the volume may be processed as pulp or lumber.

No action Alternative

The most likely condition expected to exist in the future if current management direction were to continue unchanged.

Non-commercial Forest Land

Land with more than 10 percent cover of commercial tree species but not qualifying as Commercial Forest land. These are typically very steep.

Non-Forest Land

Land that has never supported forests and lands formerly forested but now developed for such nonforest uses as crops, improved pasture, etc.

Non-interchangeable Components (NIC's)

Increments of the suitable land base and their contribution to the allowable sale quantity (ASQ) that are established to meet Forest Plan objectives. NIC's are identified as parcels of land and the type of timber thereon which are differentiated for the purpose of Forest Plan implementation. The total ASQ is derived from the sum of the timber volumes from all NIC's. The NIC's cannot be substituted for each other in the timber sale program.

NIC I. Normal Operability: This is volume scheduled from suitable lands using existing logging systems. Most of these lands are expected to be economic under projected market conditions. On average, sales from these lands have the highest probability of offering a reasonable opportunity for a purchaser to gain a profit from his/her investment and labor. This is the best operable ground.

NIC II. Difficult and Isolated Operability: This is volume scheduled from suitable lands that are available for harvest using logging systems not in common use in Southeast Alaska. Most of these lands are presently considered economically and technologically marginal. Difficult operability in the Canal Hoya Project Area would include helicopter yarding distances greater than three-quarters of a mile. Isolated operability stands are extremely difficult and costly to harvest, due to terrain or helicopter yarding distances greater than one mile.

Notice of Intent (NOI)

A notice printed in the Federal Register announcing that an Environmental Impact Statement will be prepared. The NOI must describe the proposed action and possible alternatives, describe the agency's proposed scoping process, and provide a contact person for further information.

Objectives

The precise steps to be taken and the resources to be used in achieving goals.

Old Growth

Ecosystems distinguished by old trees and related structural attributes. Old-growth forests are characterized by larger tree size, higher accumulations of large dead woody material, multiple canopy layers, different species composition, and different ecosystem function. The structure and function of an old-growth ecosystem will be influenced by its stand size and landscape position and context.

Lists 4

Old-Growth Habitat

Wildlife habitat managed to maintain old-growth forest characteristics through the planning period.

Organic Soils

Soils that contain a high percentage (generally greater than 20 to 30 percent) of organic matter throughout the soil depth.

Partial Cut

Method of harvesting trees where any number of live stems are left standing in any of various spatial patterns. Not clearcutting. Can include seed tree, shelterwood, or other methods.

Patch

A non-linear surface area differing in appearance from its surroundings.

Planning Record

A system that records decisions and activities that result from the process of developing a forest plan, revision, or significant amendment.

Plant Association

Climax plant community type.

Plant Communities

Aggregations of living plants having mutual relationships among themselves and to their environment. More than one individual plant community.

Population Viability

Ability of a population to sustain itself over time. (see viability)

Precommercial Thinning

An intermediate stand treatment in even-aged stands which removes immature or undesirable trees to reduce competition so remaining trees can more fully utilize site potential and remain in a healthy condition.

Process Group

A combination of similar stream channel types based on major differences in landform, gradient, and channel shapes.

Productive Old Growth

Old-growth forest capable of producing at least 20 cubic feet of wood fiber per acre per year, or having greater than 8,000 board feet per acre.

Public Participation

Meetings, conferences, seminars, workshops, tours, written comments, responses to survey questionnaires, and similar activities designed and held to obtain comments from the public about Forest Service activities.

Record of Decision

A document separate from but associated with an Environmental Impact Statement which states the decision, identifies all alternatives, specifying which were environmentally preferable, and states whether all practicable means to avoid environmental harm from the alternative have been adopted, and if not, why not.

Reforestation

The natural or artificial restocking of an area with trees.

Regeneration

The process of establishing a new crop of trees on previously harvested land.

Rehabilitation

Actions taken to protect or enhance site productivity, water quality, or other values.

Reserve Trees

Live or dead trees that are retained for various resource objectives such as wildlife, structural diversity, etc.

Resident Fish

Fish that are not migratory and complete their entire life cycle in freshwater. Fish that are not anadromous and that reside in freshwater on a permanent basis. Resident fish include non-anadromous Dolly Varden char and cutthroat trout.

Resource values

The tangible and intangible worth of forest resources.

Responsible Official

The Forest Service employee who has the delegated authority to make a specific decision.

Revegetation

The re-establishment and development of a plant cover. This may take place naturally through the reproductive processes of the existing flora or artificially through the direct action of reforestation or reseeded.

Riparian Area

Geographically definable area with distinctive resource values and characteristics that contain elements of aquatic and riparian ecosystems.

Riparian Ecosystem

Land next to water where plants that are dependent on a perpetual source of water occur.

Roads

Specified: Roads usually developed and operated for long-term land and resource management purposes to constant service.

Temporary: For National Forest timber sales, temporary roads are constructed to harvest timber on a one-time basis. These logging roads are not considered part of the permanent Forest transportation network and have stream crossing structures removed, erosion measures put into place, and the road closed to vehicular traffic after harvest is completed.

Roadless Area

An area of undeveloped public land within which there are no improved roads maintained for travel by means of motorized vehicles intended for highway use.

Rotation

The planned number of years (approximately 100 years in Alaska) between the time that a Forest stand is regenerated and its next cutting at a specified stage of maturity.

Salvage Cutting

Cutting primarily to utilize dead/down material resulting from windthrow and scattered poor risk trees that will not be marketable if left in the stand until the next scheduled harvest. Salvage sales must contain more than 50 percent by volume of dead, insect infested, or windthrown timber

Sawlog

That portion of a tree that is suitable in size and quality for the production of dimension lumber collectively known as sawtimber.

Scoping Process

Early and open activities used to determine the scope and significance of a proposed action, what level of analysis is required, what data is needed, and what level of public participation is appropriate. Scoping focuses on the issues surrounding the proposed action, and the range of actions, alternatives, and impacts to considered in an EA or an EIS.

Scrub-Shrub Wetland

Wetlands dominated by woody vegetation less than 20 feet tall. The species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions. In Southeast Alaska this includes forested lands where trees are stunted because of poor soil drainage.

Second Growth

Forest growth that has become established following some disturbance such as cutting, serious fire, windthrow, or insect attack; even-aged stands that will grow back on a site after removal of the previous timber stand.

Lists 4

Sediment

Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by streams or mass movement.

Sensitive Species

Plant and animal species which are susceptible or vulnerable to activity impacts or habitat alterations. Species that are recognized by the regional forester as needing special management to prevent placement on Federal or state lists.

Seral

Early stage of succession.

Silviculture

The branch of forestry involving the theory and practice of manipulating the establishment, composition, structure, and growth of forest vegetation. Silviculture involves the appropriate application of ecological, social, and economic principles of vegetative management to achieve resource management objectives and desired future forest conditions.

Silvicultural Prescription

A written technical document which provides detailed implementation direction about methods, techniques, timing, and monitoring or vegetative treatments. A prescription is prepared after a preferred treatment alternative has been selected, but before the project is implemented. A prescription is prepared by a silviculturist who uses interdisciplinary input to best achieve established objectives, direction, and requirements for land managed by the USDA Forest Service.

Site Productivity

Production capability of specific areas of land.

Slash

Debris left over after a logging operation; i.e. limbs, bark, broken pieces of logs.

Smolt

Young silvery-colored salmon or trout which move from freshwater streams to saltwater.

Snag

A standing dead tree.

Soil Productivity

The capacity of a soil, in its normal environment, to produce a specific plant or sequence of plants under a specific system of management.

Soil Resource Inventory (SRI)

An inventory of the soil resource based on landform, vegetative characteristics, soil characteristics, and management potentials.

Spawning Area

The available area in a stream course which is suitable for the deposition and incubation of salmon or trout eggs.

Special Habitats

Structural elements of ecosystems. These may include, but are not limited to: snags, spawning gravels, fallen trees, wetlands, aquatic reefs, caves, seeps, and springs.

Species Diversity

The number of different species occurring in a location or under a similar environmental condition.

Split Yarding

The process of separating the direction of timber harvest yarding into opposite directions. Often a stream is used as a dividing line.

Stand (Tree Stand)

An aggregation of trees occupying a specific area and sufficiently uniform in composition, age arrangement, and condition as to be distinguishable from the trees in adjoining areas.

Standard

A course of action or level of attainment required by the forest plan to promote achievement of goals and objectives.

State Historic Preservation Officer (SHPO)

State appointed official who administers Federal and State programs for cultural resources.

Stocking

The degree of occupancy of land by trees as measured by basal area or number of trees and as compared to a stocking standard; that is, the basal area or number of trees required to fully use the growth potential of the land.

Structural Diversity

The diversity of forest structure, both vertically and horizontally, which provides for a variety of forest habitats such as logs and multi-layered forest canopy for plants and animals.

Stumpage

The value of timber as it stands uncut in terms of dollar value per thousand board feet.

Project Area

The area of the National Forest System controlled by a decision document.

Subsistence

The term "subsistence uses" means the customary and traditional uses by rural Alaska residents of wild renewable resources for direct, personal, or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; and for customary trade.

Subsistence Use Area

Important Subsistence Use Areas include the "most reliable" and "most often hunted" categories from the Tongass Resource Use Cooperative Survey (TRUCS) and from subsistence survey data from ADFG, the University of Alaska, and the Forest Service, Region 10. Important use areas include both intensive and extensive use areas for subsistence harvest of deer, furbearers, and salmon.

Substantive Comment

A comment that provides factual information, professional opinion, or informed judgement germane to the action being proposed.

Substrate

The type of material in the bed (bottom) of rivers and streams.

Succession

The ecological progression of community change over time, characterized by displacements of species leading towards a stable climax community.

Suitability

An evaluation based upon a resource's potential use within proposed management activities.

Suitable Forest land

Forest land for which technology is available that will ensure timber production without irreversible resource damage to soils, productivity, or watershed conditions, and for which there is reasonable assurance that such lands can be adequately restocked, and for which there is management direction that indicated that timber production is an appropriate use of that area.

Sustained Yield

The amount of renewable resources that can be produced continuously at a given intensity of management.

Lists 4

Thinning

The practice of removing some of the trees in a stand so that the remaining trees will grow faster due to reduced competition for nutrients, water, and sunlight. Thinning may also be done to change the characteristics of a stand or wildlife or other purposes. Thinning may be done at two different stages.

Threatened Species

Plant or animal species which is likely to become endangered throughout all or a significant portion of its range within the foreseeable future, as defined in the Endangered Species Act of 1973, and which has been designated in the Federal Register by the Secretary of the Interior as a threatened species. (See also, endangered species, sensitive species.)

Threshold

The point or level of activity beyond which an undesirable set of responses begins to take place within a given resource system.

Timber Classification

Forested land is classified under each of the land management alternatives according to how it relates to be management of the timber resource. The following are definitions of timber classifications used for this purpose.

Nonforest: Land that has never supported forests and land formerly forested where use for timber production is precluded by development or other uses.

Forest: Land at least 10-percent stocked (based on crown cover) by forest trees of any size, or formerly having had such tree cover and not currently developed for nonforest use.

Suitable or suitable available: Land to be managed for timber production on a regulated basis.

Unsuitable: Forest land withdrawn from timber utilization by statute or administrative regulation (for example, wilderness), or identified as inappropriate for timber production in the Forest planning process.

Commercial forest: Forest land tentatively suitable for the production of continuous crops of timber and that has not been withdrawn.

Timber Harvest Unit

A "Timber Harvest Unit" is an area within which Forest Service specifies for harvest all or part of the timber.

Timber Stand Improvement (TSI)

All noncommercial intermediate cutting and other treatments to improve composition, condition, and volume growth of a timber stand.

Tongass Land Management Plan (TLMP)

See Forest Plan

Understory

The trees and shrubs in a forest growing under the canopy or overstory.

Unsuitable Forest Land

Forest land withdrawn from timber utilization by statute or administrative regulation; for example, Wilderness, or identified as not appropriate for timber production in the forest planning process.

Utility Logs

Those logs that do not meet sawlog grade but are suitable for production of firm useable pulp chips.

VAC

See Visual Absorption Capability.

Value Comparison Unit (VCU)

Areas which generally encompass a drainage basin containing one or more large stream systems; boundaries usually follow easily recognizable watershed divides. Established to provide a common set of areas where resource inventories could be conducted and resource interpretations made.

Viable Population

The number of individuals of a species required to ensure the long-term existence of the species in natural, self-sustaining populations adequately distributed throughout their region.

Viewshed

An expansive landscape or panoramic vista seen from a road, marine water way, or specific viewpoint.

Visual Quality Objectives (VQO)

A desired level of scenic quality and diversity of natural features based on physical and sociological characteristics of an area. Refers to the degree of acceptable alterations of the characteristic landscape.

Preservation: Permits ecological changes only. Applies to wilderness areas and other special classified areas. Management activities are generally not allowed in this setting.

Retention: Provides for management activities that are not visually evident to the casual Forest visitor.

Partial Retention: Management activities remain visually subordinate to the natural landscape.

Modification: Management activities may visually dominate the characteristics landscape. However, activities must borrow from naturally established form-line color and texture so that the visual characteristics resemble natural occurrences within the surrounding area when viewed in the middleground distance.

Maximum Modification: Management activities may dominate the landscape but should appear as a natural occurrence when viewed as background.

V-Notches

A deeply incised valley along some waterways that would look like a "V" from a cross-section. These abrupt changes in terrain features are often used as harvest unit or yarding boundaries.

Volume

Stand volume based on standing net board feet per acre by Scribner Rule.

Volume Strata

Categories of timber volume derived from the timber type data layer (TIMTYP) and the common land unit data layer (CLU). Three volume strata (low, medium, and high) are recognized in the Forest Plan.

Watershed

The area that contributes water to a drainage or stream. Portion of land from which all surface water drains to a common point. Watersheds can range from a few tens of acres that drain a single small intermittent stream to many thousands of acres for a stream that drains hundreds of connected intermittent and perennial streams.

Wetland

Areas that are inundated by surface or groundwater frequently enough to support vegetation that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include: swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mudflats, and natural ponds.

Wilderness

Areas designated by congressional action under the 1964 Wilderness Act. Wilderness is defined as undeveloped federal land retaining its primeval character and influence without permanent improvements or humans habitation. Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature, with the imprint of human activity substantially unnoticeable; have outstanding opportunities for solitude or a primitive and unconfined type of recreation; areas of at least 5,000 acres are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest. In Alaska, Wilderness has been designated by ANILCA and TTRA.

Wildlife Analysis Area (WAA)

A division of land used by the Alaska Department of Fish and Game for wildlife analysis and harvest statistics.

Wildlife Habitat

The locality where a species may be found and where the essentials for its development and sustained existence are obtained.

Lists 4

Windfirm

Trees that have been exposed to the wind throughout their life and have developed a strong root system or trees that are protected from the wind by terrain features.

Windthrow

The act of trees being uprooted by the wind. In Southeast Alaska, Sitka spruce and hemlock trees are shallow rooted and susceptible to windthrow. There generally are three types of windthrow:

Endemic: where individual trees are blown over;

Catastrophic: where a major windstorm can destroy hundreds of acres; and

Management Related: where the clearing of trees in an area make the adjacent standing trees vulnerable to windthrow.

Winter Range

An area, usually at lower elevation, used by big game during the winter months; usually smaller and better defined than summer ranges.

Yarding

Moving timber from the stump to a collection point done with helicopter, cable or shovels.

Literature Cited

- 11 AAC 95, 1993. Alaska Forest Resources and Practices Regulations. Division of Forestry, Alaska Department of Natural Resources.
- 18 AAC 70, 1996. Alaska Water Quality Standards, Alaska Department of Environmental Conservation.
- 36 CFR 219.27. National Forest Management Act implementing regulations.
- 36 CFR 800. National Historic Preservation Act implementing regulations.
- Alaska Department of Fish & Game, 1991a. Strategic Plan for management of deer in Southeast Alaska 1991-1995. Population Objectives. Alaska Department of Fish & Game, Division of Wildlife Conservation, Region 1.
- Cohen, 1989. Wrangell Harvest Study. A comprehensive study of wild resource harvest and use by Wrangell residents. Alaska Department of Fish & Game, Division of Subsistence, Juneau, AK. Technical paper no. 165.
- Clark, G. 1975. Archaeological Survey, Stikine Area. Unpublished manuscript. USDA Forest Service. Petersburg, Alaska.
- Clark, G. 1976. Archaeological Reconnaissance: Zarembo Island, Deer Island. Unpublished manuscript. USDA Forest Service. Petersburg, Alaska.
- Craig, G. 1986. Peregrine Falcon. pp. 807-824 in Audubon Wildlife Report 1986. The National Audubon Society, New York, New York. 1094 pp.
- DeGange, A. 1996. A conservation assessment for the Marbled Murrelet in Southeast Alaska. USDA Forest Service General Tech. Report. PNW-GTR-388.
- deGayner, G. 1998. Hanus Bay Study Observations.
- Forest Plan. See USDA Forest Service. 1997b.
- Goldschmidt, W.R. and T.H. Haas. 1998. *Haa Aani, Our Land: Tlingit and Haida Land Rights and Use*. University of Washington Press and Sealaska Heritage Foundation. Originally published in 1946 as Possessory Rights of the Natives Of Southeastern Alaska. Report to the Commissioner of Indian Affairs. U.S. Department of Interior. Washington, D.C.
- Hanley, T.A., C.T. Robbins and D.E. Spalinger. 1989. Forest Habitats and the Nutritional Ecology of the Sitka Black-tailed Deer: A Research Synthesis with Implications for Forest Management. GTR-PNW-230. Portland OR.
- Harris, A. S. 1989. Wind in the Forests of Southeast Alaska and Guides for Reducing Damage. USDA Forest Service GTR, Pacific Northwest Research Station, PNW-GTR-244.
- Iverson, G.C. et al. 1996. Conservation assessment for the Northern Goshawk in Southeast Alaska. USDA Forest Service General Tech. Report. PNW-GTR-387.
- Iverson, G.C. 1996. Design of small Old Growth Reserves.
- Kirchoff, M.D. 1991. Status, biology, and conservation concerns for the wolf in southeast Alaska. ADFG, Division of Wildlife Conservation.
- Kruse, J.A. 1993. A guide to 810 Analyses. Unpublished Draft. Institute of Social & Economic Research. University of Alaska Anchorage. 30 pages plus tables.
- Niblack, A.P. 1970. *The Coast Indians of Southern Alaska and Northern British Columbia*. First reprinting 1970, Johnson Reprint Corporation. Originally published 1888, Report of the National Museum, Washington, D.C.
- Oliver, C.D. and B.C. Larson. 1990. Forest Stand Dynamics. McGraw-Hill.

Lists 4

- Orth, D.J. 1967. *Dictionary of Alaska Place Names*. U.S. Geological Survey Paper 567. U.S. Government Printing Office, Washington, D.C.
- Pagel, J.E., D.A. Bell & B.E. Norton. 1996. De-listing the American peregrine falcon: is it premature? *Wildlife Society Bulletin* 24(3).
- Pawuk, William H. and Everett J. Kissinger, 1989. Preliminary Plant Association Classification of the Stikine Area, Tongass National Forest. USDA-Forest Service, Alaska Region, R10-TP-72.
- Roberts, L.D. 1984. Archaeological Reconnaissance of Select Areas on Deer Island, Ernest Sound. Unpublished manuscript. USDA Forest Service. Petersburg, Alaska.
- Sealaska Corporation. 1975. Native Cemetery and Historic Sites of Southeast Alaska (preliminary report). Prepared by Wilsey and Ham Consultants, Inc. Seattle, Washington.
- Suring, L.H, E.J. DeGayner, R.W. Fynn, M.D. Kirchoff, J.W.Schoen, and L.D.Shea. 1992. Habitat capability model for sitka black-tailed deer in southeast Alaska: winter habitat. USDA forest Service, Alaska Region.
- Suring, L.H. et. al. 1993b. A proposed strategy for maintaining well distributed, viable populations of wildlife associated with old-growth forests in southeast Alaska, Review Draft. Juneau, AK.
- USDA Forest Service, 1977. Deer Island Unit Management Plan Final EIS. April, 1977, USDA-FS-R10-FES (Adm) 76-08.
- USDA 1999. Tongass Land and Resource Management Plan Modified 1997 Record of Decision. April, 1999. US Department of Agriculture.
- USDA Forest Service, 1992. A channel type users guide for the Tongass National Forest, Southeast Alaska. R10TP26. Paustian, S. J., ed.
- USDA Forest Service, 1996. Timber Supply and Demand 1996,
- USDA Forest Service. 1997a. Tongass Land and Resource Management Plan Revision, FEIS, 1997. Alaska Region R10-MB-338b-h.
- USDA Forest Service. 1997b. Tongass Land and Resource Management Plan, Forest Plan, 1997, Modified with April 1999 Record of Decision. Alaska Region R10-MB-338dd.
- USDA Forest Service Handbooks
FSH 2509.22 *Soil and Water Conservation Handbook*
FSH 7709.56 *Road Preconstruction Handbook*
- USDI Fish & Wildlife Service, 1992. Subsistence Management for Federal Public Lands in Alaska. Final Environmental Impact Statement. Region 7.
- USF&WS unpublished LTF field investigation report, 1997
- USFS unpublished bark monitoring survey, 1997
- Vancouver, G. 1984. *A Voyage of Discovery to the Pacific Ocean and Round the World 1791-1795* (3 volumes). Reprinted. Da Capo Press, New York. Originally published 1798, London.
- Wagner, H.R. 1937. *The Cartography of the Northwest Coast of America to the Year 1800*. University of California Press.
- Waters, D.L. 1992. Habitat Association, phenology and biogeography of amphibians in the Stikine River Basin and Southeast Alaska.
- Waters, J. 1984. North Deer Island - Kaukan Timber Sale, Wildlife Habitat Inventory. Unpublished Report.

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Appendix A

Unit Cards and Extra Alternative Maps

Apollonius

1000

1000

Appendix A

Unit Cards and Extra Alternative Maps

Harvest Prescriptions

The prescriptions provided on the unit cards are intended to meet the objectives listed on the cards. Almost all harvest prescriptions proposed for the Kuakan project would require retaining some trees in clumps or dispersed through all or a portion of harvest units to maintain visual quality objectives and biodiversity. This strategy is consistent with the Forest Plan objective of reducing clearcutting in Modified Landscape management prescription areas, when other methods will meet land management objectives. If large enough, reserve clumps would help meet the desire to provide seed sources to eventually recolonize areas where forbs and shrubs have been shaded out by dense second growth. Reserve clumps and dispersed trees would provide a component of large trees in regenerating stands that would provide habitat for cavity nesting birds, denning bears, marten, marbled murrelets and other species associated with large trees. Where safety permits, reserve trees would include large standing snags, as well as green trees. The reserve trees would be retained in the units throughout the rotation.

Appendix G of the Forest Plan FEIS (USDA 1997b) contains information on silvicultural systems used on the Tongass. The appendix classifies the various prescriptions into three basic regeneration methods; even-aged, two-aged and uneven-aged. (Table G-2 of Appendix G). Even-aged methods include clearcutting with less than 10% reserves or cutting patches larger than 2 acres. Two-aged methods include clearcuts with more than 10% reserves or overstory removal with reserves. Uneven-aged methods include group selection and single tree selection.

The six basic harvest prescriptions used for the Kuakan project are described as:

Even-aged Methods

1. **Patch Cuts (PC):** clearcuts ranging from 2 to 10 acres, yarded by helicopter. All trees meeting contract specifications are cut and removed. Generally, there are no trees retained within harvest units. Damage to residuals trees may occur in or adjacent to the units.
2. **Clearcuts With <15% Retention (CC):** clearcuts larger than 10 acres, yarded by cable or helicopter, with less than 15% of the trees and/or acreage left in reserve clumps or scattered throughout the unit. Generally, reserves are clumped, with few individual trees retained within harvest units. Damage to residuals trees may occur in or adjacent to the units.

Two-aged Methods

3. **Clearcuts With Reserves (CC):** clearcuts larger than 10 acres, yarded by cable or helicopter, with more than 15% of the trees and/or acreage left in reserve clumps or scattered throughout the unit. Damage to residuals trees may occur in or adjacent to the units.
4. **Overstory Removal with Diameter Limits (OR):** harvest units are larger than 10 acres, yarded by helicopter, with 10% to 25% of the trees retained scattered throughout the unit. Damage to residuals trees may occur in or adjacent to the units.

Uneven-aged Methods

5. **Group Selections (GS):** harvest units are no larger than 2 acres, yarded by helicopter. All trees meeting contract specifications are cut and removed. Generally, there are no trees retained within harvest units. Damage to residuals trees may occur in or adjacent to the units.
6. **Partial Harvest using a combination of Overstory Removal, Group Selection and Individual Tree Marking to harvest 25% to 35% of the merchantable trees in the original stand (IG):** harvest units can be any acreage, yarded by helicopter, with 65% to 75% of the basal area and/or trees and/or acreage left in reserve clumps or scattered throughout the unit. Damage to residuals trees may occur in or adjacent to the units.

Over the rotation, clearcuts and overstory removal units would be entered once. Residual trees in these stands would be left as a legacy until the end of the rotation, or possibly be removed during a commercial thinning of the regenerated stand. Patch cuts and group selections would have the unit re-entered 2-4 times during a rotation, to harvest additional patches or groups. These entries would be spaced out over the rotation, with the result being 2-5 distinct age classes developing within the unit. An initial partial harvest entry (such as Alt. 5) would not be considered a regeneration harvest, and we would anticipate limited natural regeneration. We do anticipate increased growth on residual trees as a result of opening the canopy. Partial harvest units would have a second entry at approximately 1/3 the rotation age to remove more of the overstory and create enough openings to enhance regeneration under the remaining canopy. A third entry might occur 2/3 into the rotation to remove the remaining overstory and promote growth in the understory. Some legacy of large trees would probably be left, even after the third entry.

Kuakan EIS**Unit Number 1****Treatment Acres 66**

Volstrata Acres: Low 1 Medium 22 High 43 Net Volume (MBF/Acre): 26 MBF

Unit Development & Stand Description

Species composition is 53% hemlock, 3% Sitka spruce, 21% yellow-cedar, 23% western redcedar. Ensure east side of unit is located outside of TTRA buffer. Groups will not exceed 2 acres in size and will follow water quality and wildlife concerns listed below. Alternatives 2 & 3 cable yard the volume to the road system, Alternative 4 volume will be helicopter yarded to a barge as no roads are constructed in this alternative. The unit contains 43 acres of high value marten habitat.

	Alt. 2	Alt. 3	Alt. 4
Treatment	Group Selection	Group Selection	Group Selection
% Retention of Ac, Trees/ac, or Vol.	75% Ac	75% Ac	75% Ac
% Volume Removed	25%	25%	25%
Leave trees for Marten	No	No	No
Harvest Volume (MBF)	442	442	442
Cable Logging System Acres	None	None	None
Helicopter Logging System Acres	17	17	17
Yarded To	Road	Road	Barge

Stand Management Objectives:

Desired future condition for this is having multiple canopy layers. Stand will be predominately uneven-aged. 75% of the stand is being retained to meet visual quality objectives and to provide structure for wildlife. Harvesting is to be done in small groups not exceeding two acres in size, distributed throughout the stand. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, or pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit is adjacent to Canyon Creek (Class I stream). Stream process group is HC with transition to MM. Stream sideslope may be continuous slope into unit area. Alluvial fan (HC transition to AF) at mouth of Class III tributary to Canyon Creek at south end of unit.

Mitigation: No timber harvest within 100 feet horizontal distance of Canyon Creek. No timber harvest within notch adjacent to HC streams. Where sideslope break is indistinguishable from slope into unit, avoid harvest on slopes greater than 72%. No timber harvest within 120 feet of MM stream. No timber harvest within 140 feet of outermost active alluvial fan channel. Fisheries specialist will assist with unit layout.

Soils

Concern: Steep slopes adjacent to stream buffers.

Mitigation: Locate groups on slopes less than 72%. Helicopter yarding will minimize soil disturbance.

Wildlife

Concern: Unit may be within post-fledging area of goshawk nest. Adult bird seen circling above this stand. High value marten habitat.

Mitigation: Group selection units and 75% retention will maintain a forested canopy for use as goshawk foraging habitat. Permit no continuous disturbance within 600 feet of a goshawk nest from March 15 to August 15 if the nest is active. Groups not larger than 2 acres follow Forest Plan marten standards for retention and forest structure.

Visuals

Concern: Meet the Modification VQO. The upper portion of this unit is visible from the Frosty Viewpoint.

Mitigation: The group selection prescription, combined with 75% retention will mitigate visual concerns.

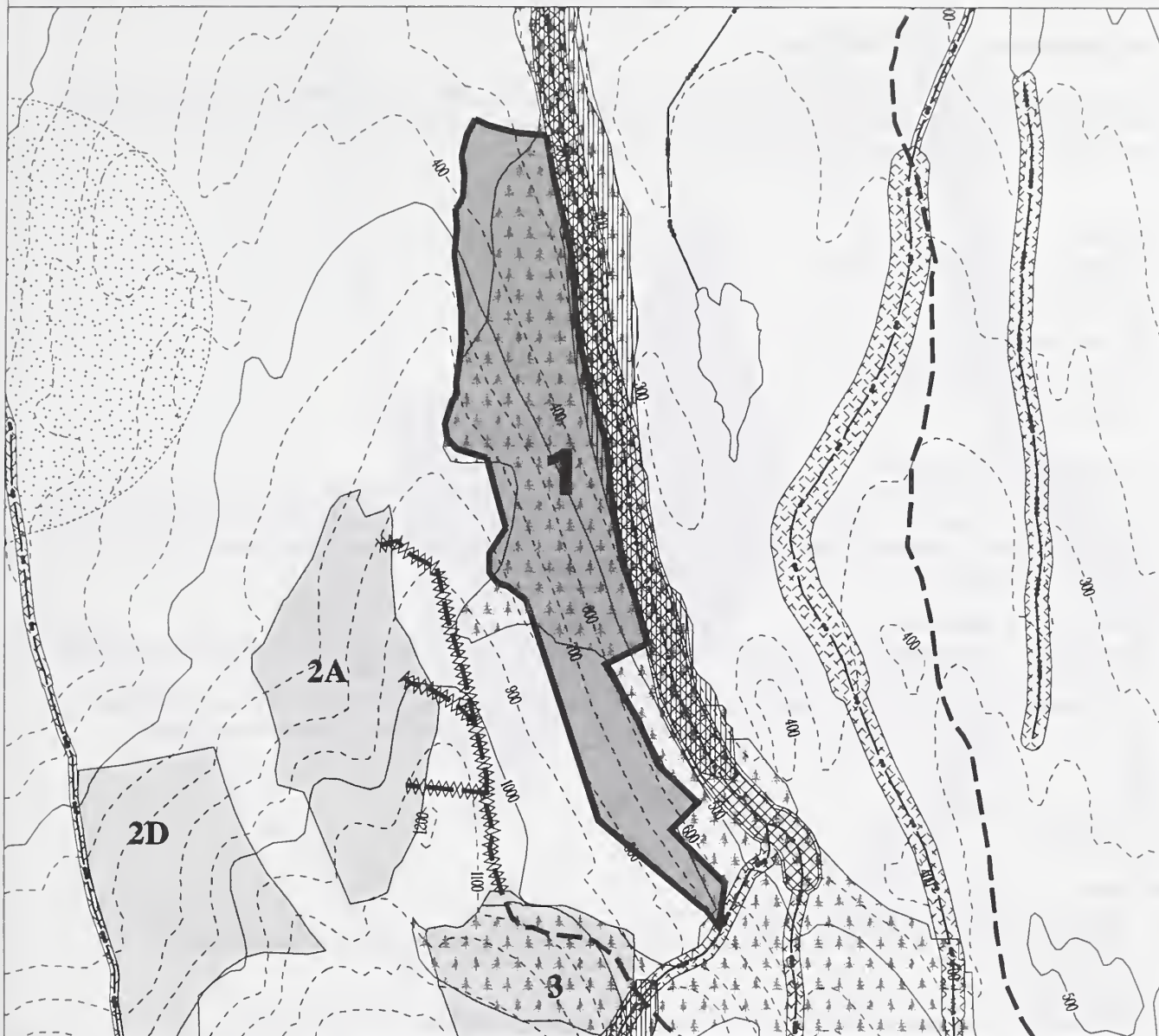
Layout and Contract Concerns: Stream protection, timing restrictions, steep slopes, group size.

Mitigation Measures: F1, F4, F5, W4, W6, W9, W16, V4.

66 ACRES

ALTERNATIVE 2 3 4

UNIT 1



Class I Streams

Class II Streams

Class III Streams

Class IV Streams

Proposed Roads - Alt 2 only

Proposed Roads - Alts 2 and 3

Proposed Non-system Roads



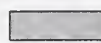
Eagle Nest Tree



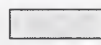
Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
2 3 4	Group Selection	75	Helicopter	Alt 4 no roads

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 20 Medium 78 High 0 Net Volume (MBF/Acre): 22 MBF

Unit Development & Stand Description

Species composition is 39% hemlock, 5% Sitka spruce, 28% yellow-cedar, 28% western redcedar. West side of unit is located adjacent to stream. Harvest in patches, from two to ten acres in size, distributed throughout the stand. In wetlands, minimize felling of non-merchantable trees that will not be yarded.

Alt. 6

Treatment	Patch Cut
% Retention of Ac, Trees/ac, or Vol.	67%
% Volume Removed	33%
Leave trees for Marten	None
Harvest Volume (MBF)	704
Cable Logging System Acres	None
Helicopter Logging System Acres	32
Yarded To	Barge

Stand Management Objectives:

Desired future condition for this is having multiple aged classes. Stand will be predominately uneven-aged, but the patches will be managed as even-aged. 67% of the stand is being retained to meet visual quality objectives and to provide structure. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, or pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit is adjacent to Foam Creek (Class II and III). Stream process group is HC. Unit may contain Class IV tributaries to Foam Creek.

Mitigation: No harvest within notch adjacent to HC stream. Verify presence of Class IV streams. Unit designed for helicopter yarding which will ensure that streams receive adequate suspension during yarding.

Soils

Concern: None

Mitigation:

Wildlife

Concern: Eagle nest locations on adjacent beach.

Mitigation: Follow MOU timing restrictions to avoid helicopter or ground disturbance within the nest buffer.

Visuals

Concern: Meet the Modification VQO. This unit is visible from the North Ernest Viewpoint.

Mitigation: 67% retention will help to mitigate visual concerns. Design patch unit boundaries to blend with landscape.

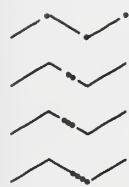
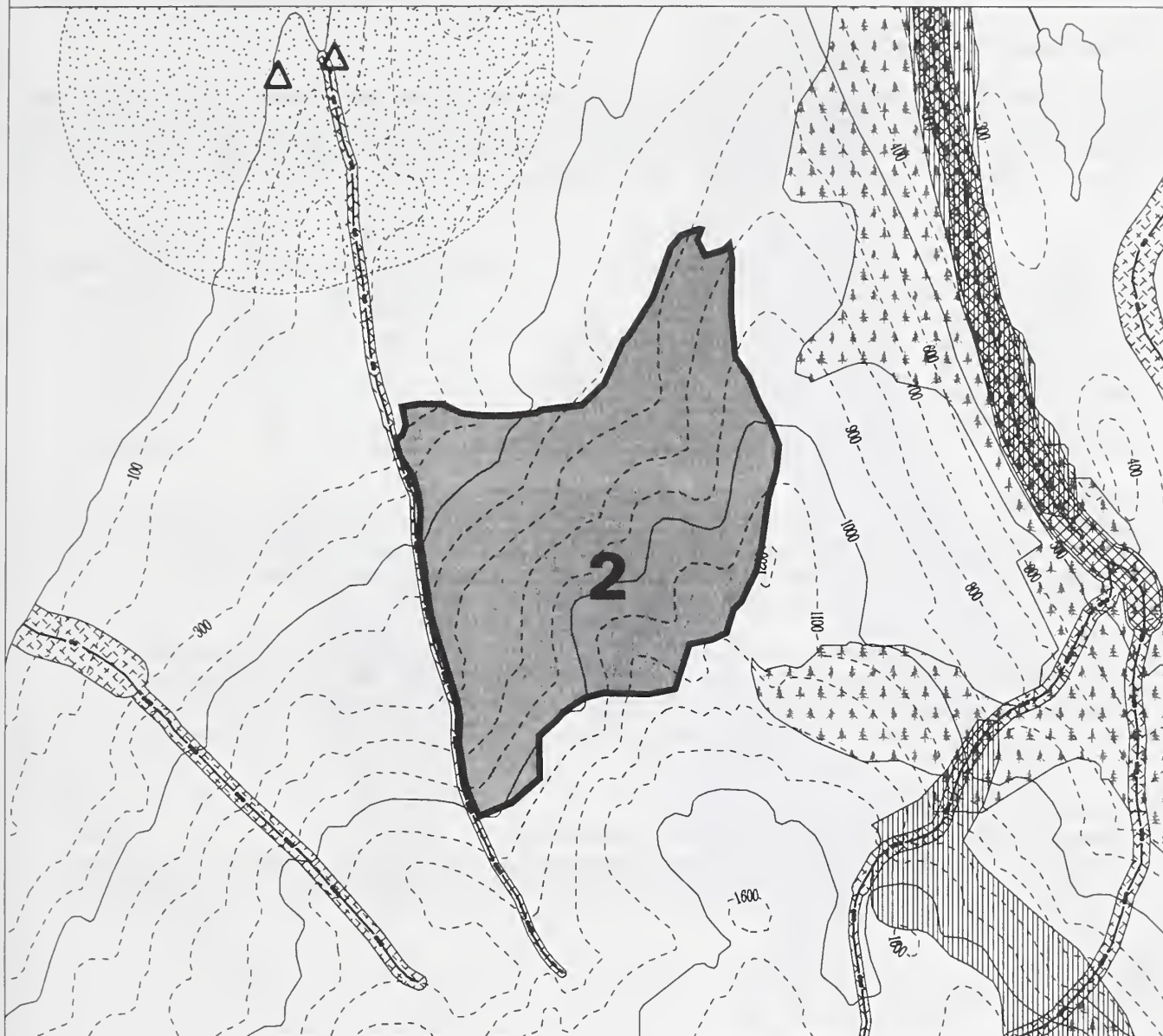
Layout and Contract Concerns: Stream protection, timing restrictions, wetlands, patch design.

Mitigation Measures: F1, F2, F3, W3, W6, W10, V3.

98 ACRES

ALTERNATIVE 6

UNIT 2



Class I Streams
Class II Streams
Class III Streams
Class IV Streams



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
6	Patch Cut	67	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 7 Medium 31 High 0 Net Volume (MBF/Acre): 22 MBF

Unit Development & Stand Description

Species composition is 39% hemlock, 5% Sitka spruce, 28% yellow-cedar, 28% western redcedar. Unit is planned for cable yarding in Alternatives 2 & 3 and will have 6 acres retained within the unit. Areas of retention will be primarily along split lines between landings. In Alternative 4 the unit is planned for overstory removal by helicopter yarding, with the logs flown to a barge. 15% of the trees greater than 9" at dbh. will be retained, scattered throughout the unit.

	Alt. 2	Alt. 3	Alt. 4
Treatment	Clearcut with Reserves	Clearcut with Reserves	Overstory Removal
% Retention of Ac, Trees/ac or Vol	15% 6 acres	15% 6 acres	15% Trees/ac
% Volume Removed	85%	85%	96%
Harvest Volume (MBF)	704	704	803
Leave trees for Marten	No	No	No
Cable Logging System Acres	32	32	None
Helicopter Logging System Acs	None	None	38
Yarded To	Road	Road	Barge

Stand Management Objectives:

Alternatives 2 and 3: Desired future condition for this stand is even-aged with reserve clumps. Trees are being retained to meet visual quality objectives and to provide structure. Retention shall be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-30 to 110-180 trees per acre.

Alternative 4: Desired future condition for this stand is having two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit may contain Class IV tributaries to Foam Creek.

Mitigation: Verify presence of Class IV streams. Unit designed for uphill yarding in Alternatives 2 & 3. Ensure the streams receive adequate suspension during yarding. Helicopter yarding in Alternative 4 ensures full suspension.

Soils

Concern: None

Mitigation:

Wildlife

Concern: Eagle nest locations on adjacent beach.

Mitigation: Follow MOU timing restrictions to avoid helicopter or ground disturbance within the nest buffer.

Visuals

Concern: Meet the Modification VQO. This unit is visible from the North Ernest Viewpoint.

Mitigation: Proposed size (under 40 acres) and retention will help to mitigate visual concerns.

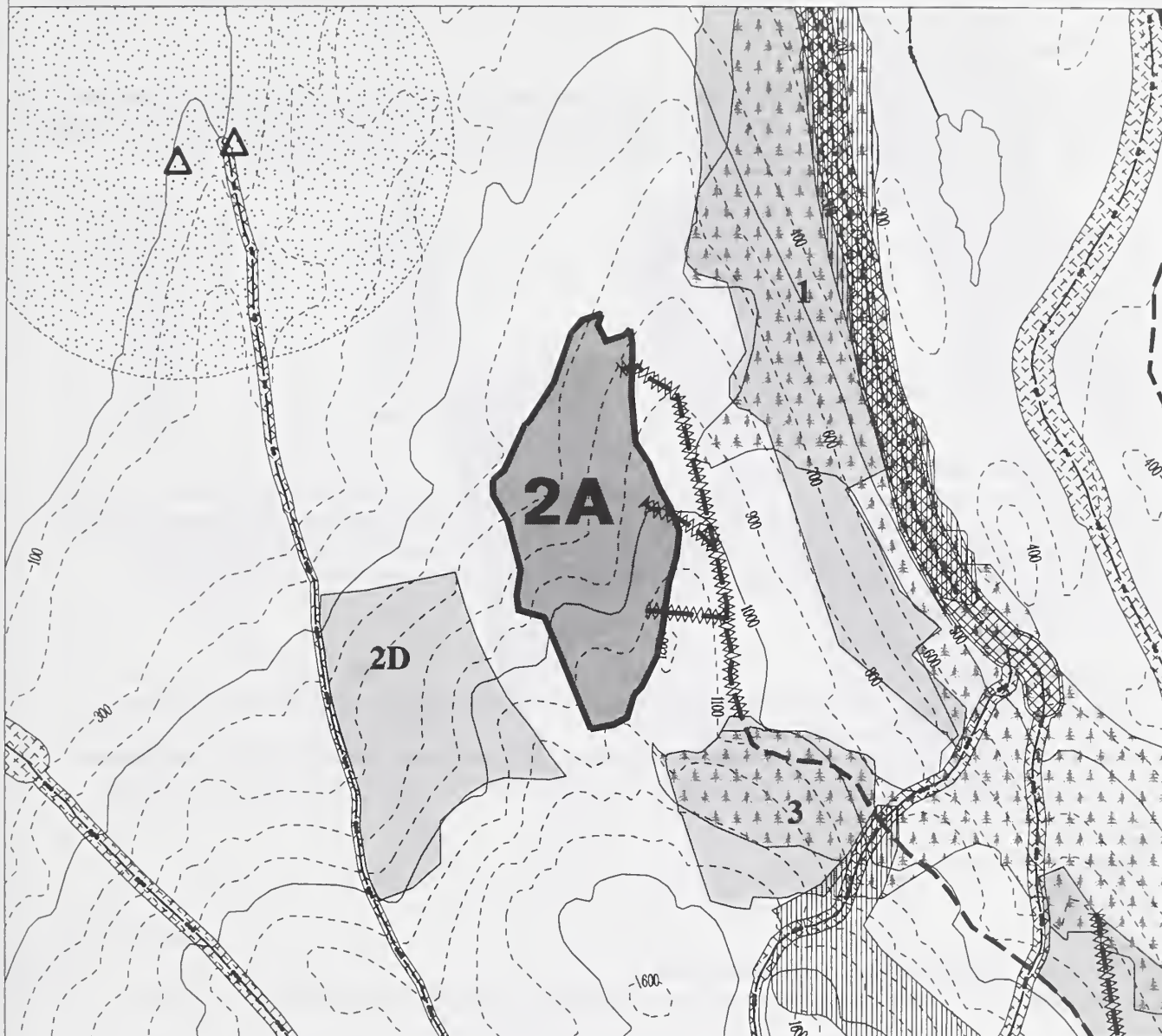
Layout and Contract Concerns: Stream protection, timing restrictions, visual retention.

Mitigation Measures: F2, W6, W10, V1, V2.

38 ACRES

ALTERNATIVE 2 3 4

UNIT 2A



- | | | | | | |
|--|------------------------------|--|------------------|--|-----------------------------|
| | Class I Streams | | Eagle Nest Tree | | Proposed cut unit |
| | Class II Streams | | Riparian Buffers | | Adjacent proposed units |
| | Class III Streams | | TTRA Buffers | | Marten Guidelines Apply |
| | Class IV Streams | | | | Existing Harvest Units |
| | Proposed Roads -Alt 2 only | | | | High Hazard Soils |
| | Proposed Roads -Alts 2 and 3 | | | | Saltwater and Lakes |
| | Proposed Non-system Roads | | | | 1/4 Mile Eagle Nest Buffers |

Alternative	Prescription	Retention	Harvest System	Comments
2 3	Clearcut	15	Cable	
4	Overstory Removal	15	Helicopter	no roads

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 12 Medium 24 High 0 Net Volume (MBF/Acre): 22 MBF

Unit Development & Stand Description

Species composition is 39% hemlock, 5% Sitka spruce, 28% yellow-cedar, 28% western redcedar. Unit is planned for overstory removal by helicopter yarding, with the logs flown to a barge in Alternative 4, and flown to the road in Alternatives 2 & 3. Western boundary along class III stream. 15% of the trees will be retained, scattered throughout the unit.

	Alt. 2	Alt. 3	Alt. 4
Treatment	Overstory s	Overstory	Overstory
%Retention of Ac, Trees/ac or Vol.	15% Trees/Ac	15% Trees/Ac	15% Trees/Ac
% Volume Removed	96%	96%	96%
Leave trees for Marten	No	No	No
Harvest Volume (MBF)	760	760	760
Cable Logging System Acres	None	None	None
Helicopter Logging System Acres	36	36	36
Yarded To	Road	Road	Barge

Stand Management Objectives:

Desired future condition for this is having two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives and to provide structure. Retention shall be left until next rotation. In wetlands, minimize felling trees that will not be yarded. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit is adjacent to Foam Creek (Class II and III). Stream process group is HC. Unit may contain Class IV tributaries to Foam Creek.

Mitigation: No harvest within notch adjacent to HC stream. Verify presence of Class IV streams. Unit designed for helicopter yarding which will ensure that streams receive adequate suspension during yarding.

Soils

Concern: None.

Mitigation:

Wildlife

Concern: Eagle nest locations on adjacent beach.

Mitigation: Follow MOU timing restrictions to avoid helicopter or ground disturbance within the nest buffer.

Visuals

Concern: Meet the Modification VQO. This unit is visible from the North Ernest Viewpoint.

Mitigation: Proposed size (under 40 acres) and retention will help to mitigate visual concerns.

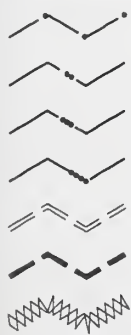
Layout and Contract Concerns: Stream protection, timing restriction, wetlands, visual retention.

Mitigation Measures: F1, F2, F3, W6, W10, V2.

36 ACRES

ALTERNATIVE 2 3 4

UNIT 2D



Class I Streams

Class II Streams

Class III Streams

Class IV Streams

Proposed Roads – Alt 2 only

Proposed Roads – Alts 2 and 3

Proposed Non-system Roads



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
2 3 4	Overstory Removal	15	Helicopter	Alt 4 no roads

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 1 Medium 7 High 16 Net Volume (MBF/Acre): 27 MBF

Unit Development & Stand Description

Species composition is 48% hemlock, 4% Sitka spruce, 48% yellow-cedar. Unit is planned for cable yarding in Alternatives 2 & 3 and will have 4 acres retained within the unit. Areas of retention will be primarily along split lines between landings. In Alternative 4 the unit is planned for overstory removal by helicopter yarding, with the logs flown to a barge. 15% of the trees will be retained, scattered throughout the unit. The unit contains 16 acres of high value marten habitat.

	Alt. 2	Alt. 3	Alt. 4
Treatment	Clearcut with Reserves	Clearcut with Reserves	Overstory Removal
% Retention of Ac, Trees/Ac or Vol.	15% Ac	15% Ac	15% Trees/Ac
% Volume Removed	82%	82%	95%
Leave trees for Marten	Yes	Yes	Yes
Harvest Volume (MBF)	531	531	613
Cable Logging System Acres	20	20	None
Helicopter Logging System Acres	None	None	24
Yarded To	Road	Road	Barge

Stand Management Objectives:

Alternatives 2 and 3: Desired future condition for this stand is predominately even-aged with reserve clumps. Trees are being retained to meet visual quality objectives, marten guidelines, and to provide structure. Retention shall be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-30 to 110-180 trees per acre.

Alternative 4: Desired future condition for this stand is having two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives, marten guidelines, and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit adjacent to Class III (HC) tributary to Canyon Creek. Unit may contain Class IV streams.

Mitigation: No timber harvest within notch adjacent to Class III stream. Verify presence of Class IV streams within unit and ensure adequate suspension during yarding.

Soils

Concern: Harvest on oversteepened slopes.

Mitigation: Layout unit to avoid slopes over 72%, unless verified by Soil Scientist prior to layout.

Wildlife

Concern: High value marten habitat.

Mitigation: Follow Forest Plan marten standards for retention of 7 trees/acre and forest structure.

Visuals

Concern: Meet the Modification VQO. This unit is visible from the Frosty Viewpoint.

Mitigation: Proposed size (under 40 acres) and retention will help to mitigate visual concerns.

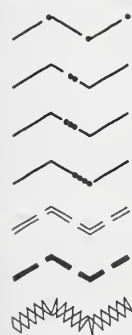
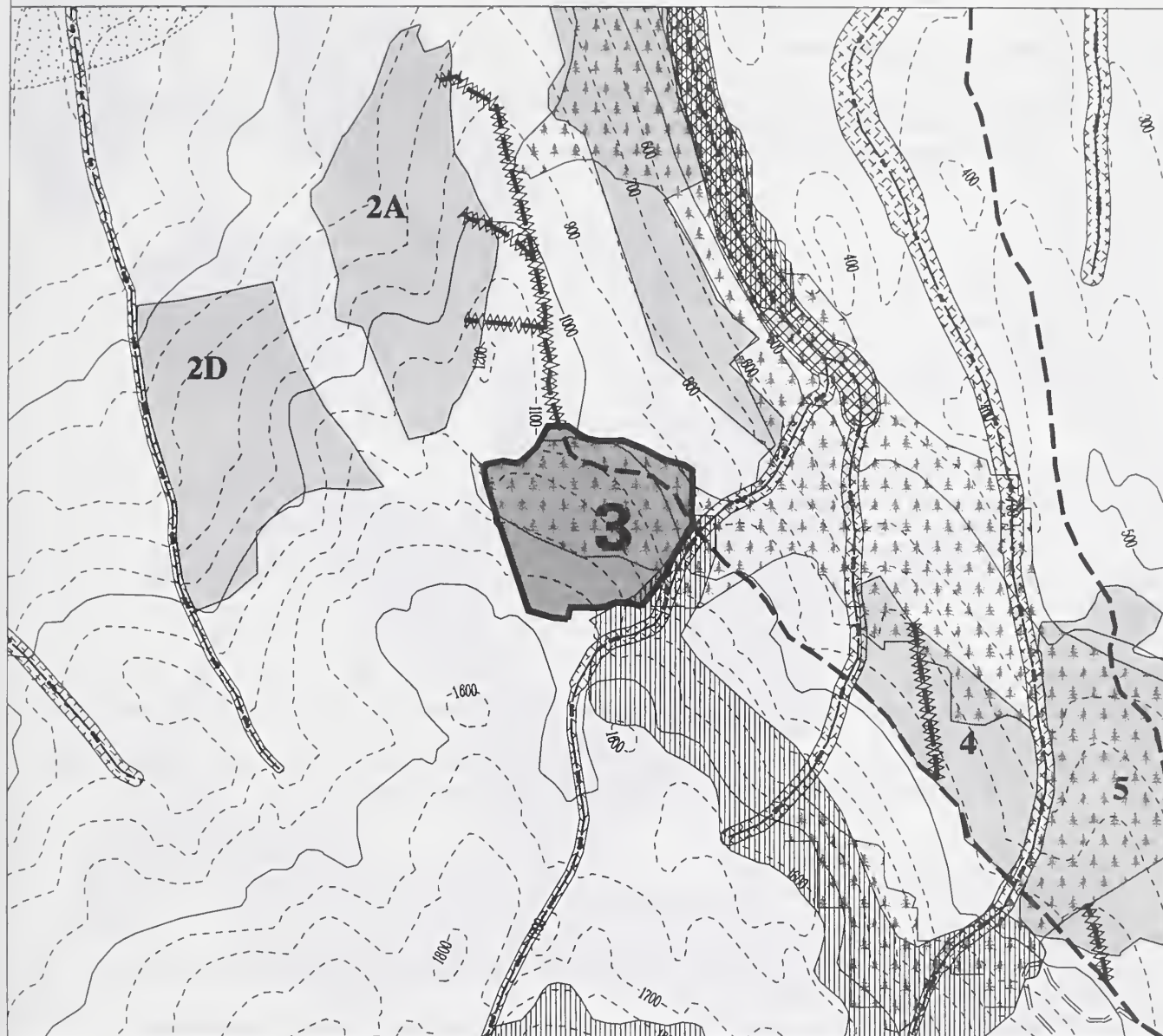
Layout and Contract Concerns: Stream protection, steep slopes, marten, retention.

Mitigation Measures: F2, F4, F5, W1, W2, W16, V1, V2.

24 ACRES

ALTERNATIVE 2 3 4

UNIT 3



Class I Streams

Class II Streams

Class III Streams

Class IV Streams

Proposed Roads - Alt 2 only

Proposed Roads - Alts 2 and 3

Proposed Non-system Roads



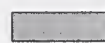
Eagle Nest Tree



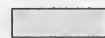
Riparian Buffers



TTRA Buffers



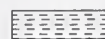
Proposed cut unit



Adjacent proposed units



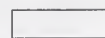
Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
2 3	Clearcut	15	Cable	
4	Overstory Removal	15	Helicopter	no roads

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 8 Medium 8 High 5 Net Volume (MBF/Acre): 22 MBF

Unit Development & Stand Description

Species composition is 55% hemlock, 5% Sitka spruce, 31% yellow-cedar, 9% western redcedar. Unit is planned for cable yarding and will have 3 acres retained within the unit. Areas of retention will be primarily along split lines between landings, or may be scattered throughout the unit. The unit contains 5 acres of high value marten habitat.

	Alt. 2	Alt. 3
Treatment	Clearcut with Reserves	Clearcut with Reserves
% Retention of Ac, Trees/ac or Vol.	15% Ac	15% Ac
% Volume Removed	85%	85%
Leave trees for Marten	Yes	Yes
Harvest Volume (MBF)	396	396
Cable Logging System Acres	18	18
Helicopter Logging System Acres	None	None
Yarded To	Road	Road

Stand Management Objectives:

Desired future condition for this stand is predominately even-aged with reserve clumps and scattered trees. Trees are being retained to meet visual quality objectives, marten guidelines, and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-30 to 110-180 trees per acre.

Water Quality & Fisheries

- Concern:** Unit lies between Class III (HC) tributaries to Lost and Canyon Creeks. Unit may contain small Class IV streams.
- Mitigation:** No timber harvest within notch adjacent to Class III streams. Verify location of Class IV streams and design unit to provide adequate suspension over streams during yarding

Soils

- Concern:** Loss of productive forest land.
- Mitigation:** Keep spur road construction to a minimum.

Wildlife

- Concern:** Unit may be within post-fledging area of goshawk nest. Unit is adjacent to goshawk nest buffer. High value marten habitat.
- Mitigation:** The portion of the unit within the goshawk nest buffer was dropped. Permit no continuous disturbance within 600 feet of a goshawk nest from March 15 to August 15 if the nest is active. Follow Forest Plan marten standards for retention of 7 trees/acre and forest structure.

Visuals

- Concern:** Meet the Modification VQO. This unit is visible from the Frosty Viewpoint.
- Mitigation:** Small size and proposed retention will help to mitigate visual concerns.

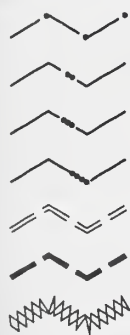
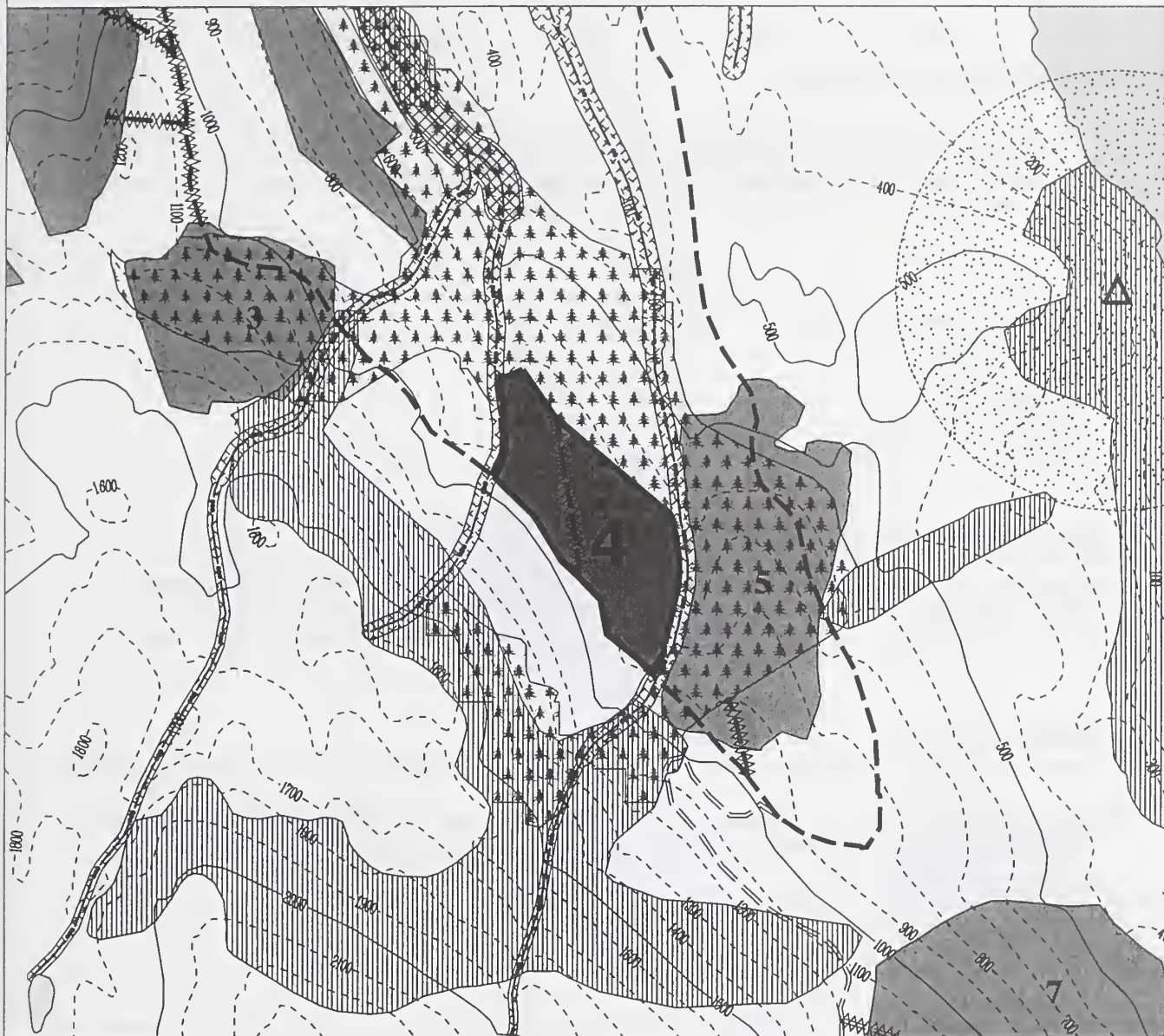
Layout and Contract Concerns: Stream protection, timing restrictions, marten, retention

Mitigation Measures: F2, W1, W8, W9, V1.

21 ACRES

ALTERNATIVE 2 3

UNIT 4



Class I Streams

Class II Streams

Class III Streams

Class IV Streams

Proposed Roads -Alt 2 only

Proposed Roads -Alts 2 and 3

Proposed Non-system Roads



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



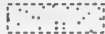
Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
2 3	Clearcut	15	Cable	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 15 Medium 18 High 5 Net Volume (MBF/Acre): 22 MBF

Unit Development & Stand Description

Species composition is 55% hemlock, 5% Sitka spruce, 31% yellow-cedar, 9% western redcedar. Unit is planned for overstory removal with helicopter yarding and the logs flown to a barge. 15% of the trees will be retained, scattered throughout the unit. Eastern and western boundaries are along Class IV streams. Unit was reduced in size because of goshawk nest. The unit contains 5 acres of high value marten habitat.

Alt. 4

Treatment	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	15% Trees/Ac
% Volume Removed	85%
Leave trees for Marten	Yes
Harvest Volume (MBF)	800
Cable Logging System Acres	None
Helicopter Logging System Acres	38
Yarded To	Barge

Stand Management Objectives:

Desired future condition for this is having two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives, meet marten guidelines, and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit lies between Class III (HC) tributaries to Lost and Canyon Creeks. Unit may contain small Class IV streams.

Mitigation: No timber harvest within notch adjacent to Class III streams. Verify location of Class IV streams. Helicopter yarding provides adequate suspension over streams during yarding.

Soils

Concern: None

Mitigation:

Wildlife

Concern: Unit may be within post-fledging area of goshawk nest. Unit is adjacent to goshawk nest buffer and contains high value marten habitat.

Mitigation: The portion of the unit within the goshawk nest buffer was dropped. Permit no continuous disturbance within 600 feet of a goshawk nest from March 15 to August 15 if the nest is active. Follow Forest Plan marten standards for retention of 7 trees/acre and forest structure.

Visuals

Concern: Meet the Modification VQO. This unit is visible from the Frosty Viewpoint.

Mitigation: Proposed size (under 40 acres) and retention will help mitigate visual concerns.

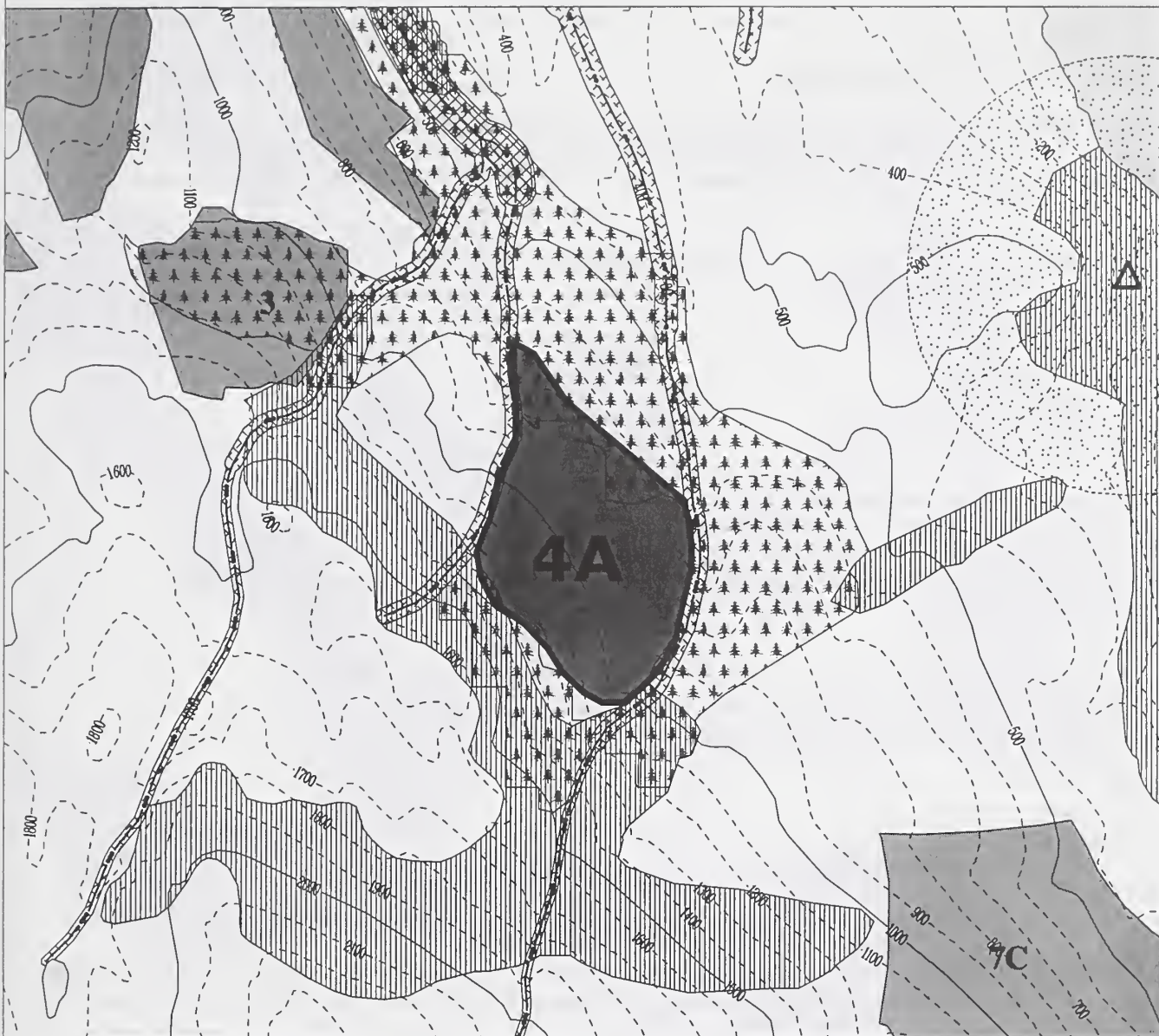
Layout and Contract Concerns: Stream protection, timing restrictions, marten, retention.

Mitigation Measures: F2, W2, W8, W9, V2.

38 ACRES

ALTERNATIVE 4

UNIT 4A



- | | | | | | |
|--|-------------------|--|------------------|--|-----------------------------|
| | Class I Streams | | Eagle Nest Tree | | Proposed cut unit |
| | Class II Streams | | Riparian Buffers | | Adjacent proposed units |
| | Class III Streams | | TTRA Buffers | | Marten Guidelines Apply |
| | Class IV Streams | | | | Existing Harvest Units |
| | | | | | High Hazard Soils |
| | | | | | Saltwater and Lakes |
| | | | | | 1/4 Mile Eagle Nest Buffers |

Alternative	Prescription	Retention	Harvest System	Comments
4	Overstory Removal	15	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Kuakan EIS**Unit Number 5****Treatment Acres 40**Volstrata Acres: Low 2 Medium 10 High 28 Net Volume (MBF/Acre): 25 MBF**Unit Development & Stand Description**

Species composition is 61% hemlock, 4% Sitka spruce, 27% yellow-cedar, 8% western redcedar. Unit is planned for cable yarding with 15% (6 acres) retained within the unit for wildlife and visuals. Areas of retention will be primarily along split lines between landings, or may be scattered throughout the unit. The unit contains 28 acres of high value marten habitat.

	Alt. 2	Alt. 3
Treatment	Clearcut with Reserves	Clear with Reserves
% Retention or Ac, Trees/Ac or Vol	15% Ac	15% Ac
% Volume Removed	84%	84%
Leave trees for Marten	Yes	Yes
Harvest Volume (MBF)	836	836
Cable Logging System Acres	34	34
Helicopter Logging System Acres	None	None
Yarded To	Road	Road

Stand Management Objectives:

Stand will be predominately even-aged with reserve clumps and scattered trees. Trees are being retained to meet visual quality objectives, marten guidelines, and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-30 to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit adjacent to Class III (HC) tributary to Lost Creek

Mitigation: No timber harvest within notch of Class III stream.

Soils

Concern: None.

Mitigation:

Wildlife

Concern: Unit may be within post-fledging area of goshawk nest. Unit is adjacent to goshawk nest buffer and between two nest locations. High value marten habitat.

Mitigation: Permit no continuous disturbance within 600 feet of a goshawk nest from March 15 to August 15 if the nest is active. Follow Forest Plan marten standards for retention of 7 trees/acre and forest structure.

Visuals

Concern: Meet the Modification VQO. This unit is visible from the Frosty Viewpoint.

Mitigation: Proposed size (under 40 acres) and retention will help to mitigate visual concerns.

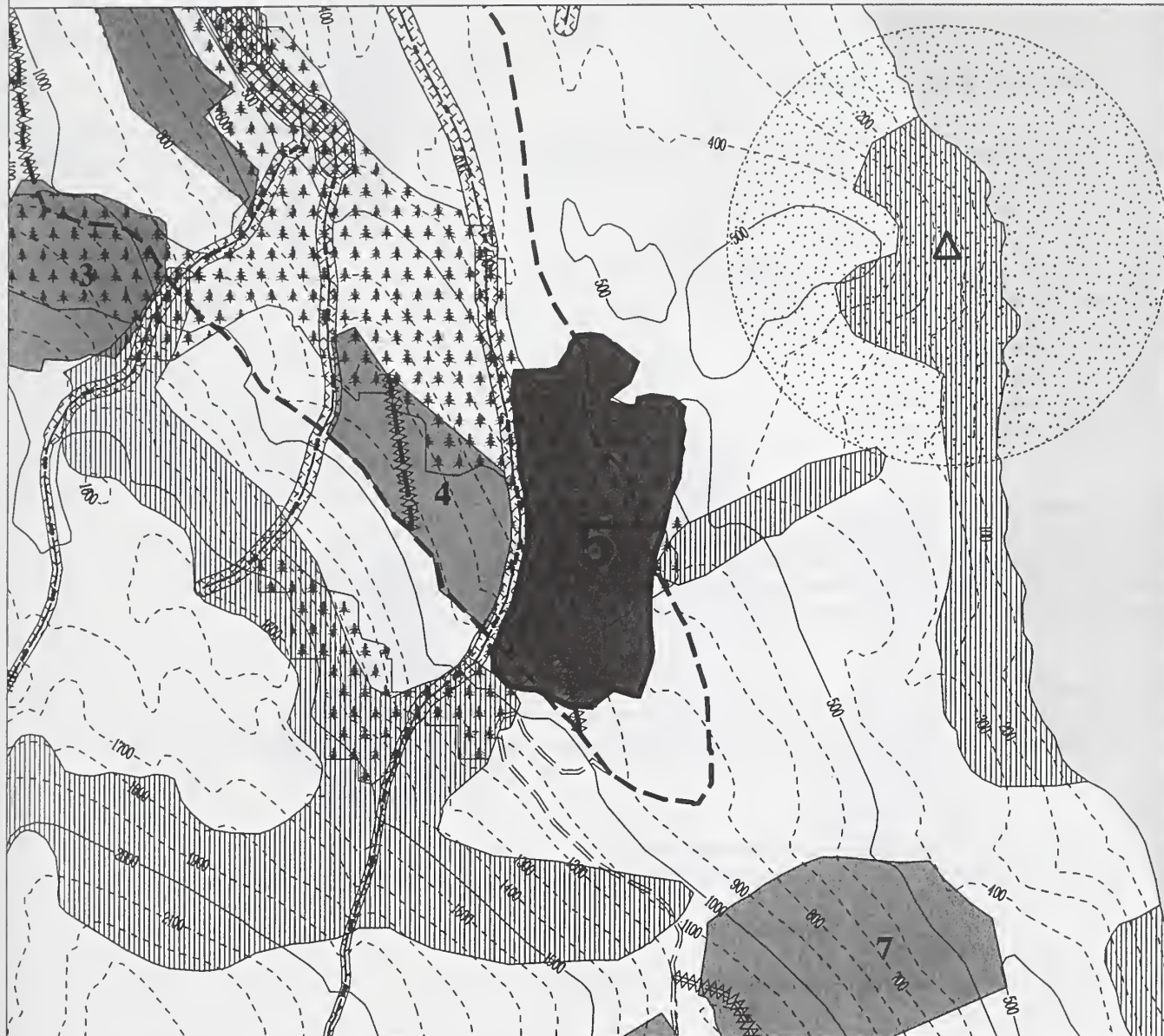
Layout and Contract Concerns: Stream protection, timing restrictions, marten, retention.

Mitigation Measures: F1, F5, W1, W8, W9, V1.

40 ACRES

ALTERNATIVE 2 3

UNIT 5



Class I Streams

Class II Streams

Class III Streams

Class IV Streams

Proposed Roads -Alt 2 only

Proposed Roads -Alts 2 and 3

Proposed Non-system Roads



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



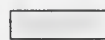
Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
2 3	Clearcut	15	Cable	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Kuakan EIS**Unit 7****Treatment Acres****40**

Volstrata Acres: Low 2 Medium 38 High 0 Net Volume (MBF/Acre): 19 MBF

Unit Development & Stand Description

Species composition is 63% hemlock, 11% Sitka spruce, 24% yellow-cedar, 2% western redcedar. Unit is planned for uphill cable yarding with 15% (6 acres) retained within the unit for wildlife and visuals. Areas of retention will be primarily along split lines between landings, or may be scattered throughout the unit.

Alt. 2

Treatment	Clearcut with Reserves
% Retention of Ac, Trees/Ac or Vol	15% Ac
% Volume Removed	85%
Leave trees for Marten	No
Harvest Volume (MBF)	646
Cable Logging System Acres	34
Helicopter Logging System Acres	None
Yarded To	Road

Stand Management Objectives:

Stand will be predominately even-aged with reserve clumps or scattered trees. Trees are being retained to meet visual quality objectives and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-30 to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit may contain Class IV tributaries to marine waters.

Mitigation: Verify Class IV streams in unit and ensure unit design provides adequate suspension over streams during yarding.

Soils

Concern: Harvest on unmapped oversteepened slopes.

Mitigation: Layout unit to avoid slopes over 72%, unless verified by Soil Scientist prior to layout.

Wildlife

Concern: Wildlife habitat.

Mitigation: 15% retention will provide structure for wildlife.

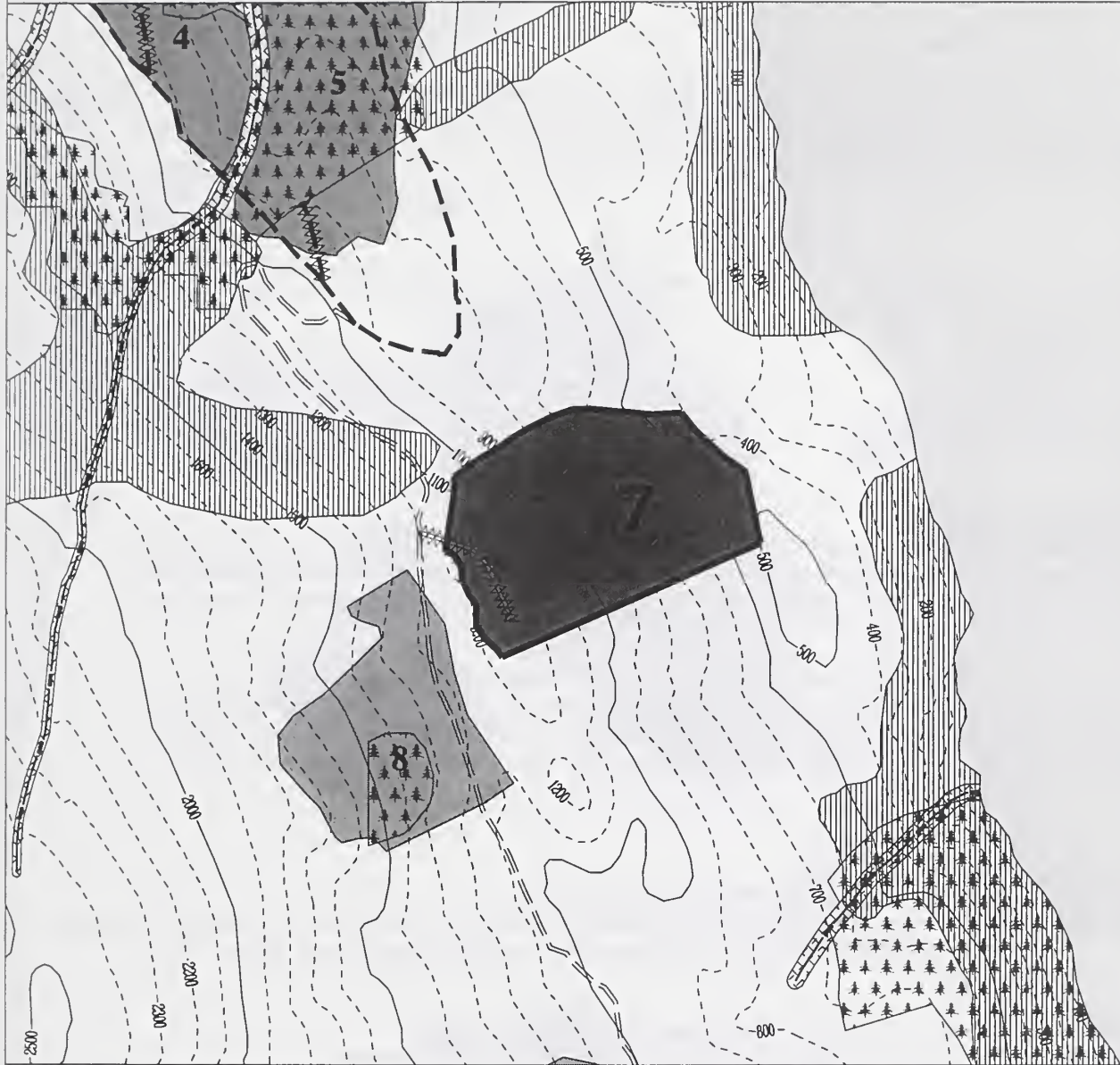
Visuals

Concern: Meet the Modification VQO. This unit is highly visible from the North Ernest Viewpoint.

Mitigation: Proposed size (under 40 acres) and retention will help to mitigate visual concerns. Where possible, design retention to further mitigate visuals (emphasizing scattered trees vs. clumps).

Layout and Contract Concerns: Stream protection, steep slopes, visuals.

Mitigation Measures: F2, F4, F5, W1, V1.



Class I Streams

Class II Streams

Class III Streams

Class IV Streams

Proposed Roads -Alt 2 only

Proposed Roads -Alts 2 and 3

Proposed Non-system Roads



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
2	Clearcut	15	Cable	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 5 Medium 88 High 0 Net Volume (MBF/Acre): 19 MBF

Unit Development & Stand Description

Species composition is 63% hemlock, 11% Sitka spruce, 24% yellow-cedar, 2% western redcedar. . Unit 7A is 12 acres and will be cable yarded with 10% (1 acre) retained. Unit 7B is 81 acres and will be helicopter yarded. 7B will have approximately 25% of the stand treated in patches up to 5 acres in size.

Alt. 3

	<u>7A</u>	<u>7B</u>
Treatment	Clearcut with Reserves	Patch Cut
% Retention of Ac, Trees/Ac or Vol	10% Ac	75% Ac
% Volume Removed	90%	25%
Leave trees for Marten	No	No
Harvest Volume (MBF)	209	380
Cable Logging System Acres	11	None
Helicopter Logging System Acres	None	20
Yarded To	Road	Road

Stand Management Objectives:

7A -Desired future conditions for this stand is predominately even-aged managment with reserve clumps. Trees are being retained to meet visual quality objectives and to provide structure. Retention will be maintained until next rotation. Natural regeneration is expected. Future stand treatments may include; planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-30 to 110-180 trees per acre.

7B - Desired future conditions for this stand is multiple-aged with multiple canopy layers. Stand will be predominately uneven-aged, but the patches will be managed as even-aged. 75% of the stand is being retained to meet visual quality objectives and to provide structure. Natural regeneration is expected. Future stand treatments may include; planting of Sitka spruce or yellow-cedar, or pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit may contain Class IV tributaries to marine waters.

Mitigation: Verify Class IV streams in unit. In 7A, ensure unit design provides adequate suspension over streams during yarding. In 7B, helicopter yarding provides adequate suspension over streams.

Soils

Concern: 7A- None. 7B - Harvest on unmapped oversteepened slopes.

Mitigation: 7B - Helicopter yarding, retaining trees less than 9" dbh throughout stand.

Wildlife

Concern: Wildlife habitat.

Mitigation: Proposed retention will provide structure for wildlife.

Visuals

Concern: Meet the Modification VQO. Both 7A and 7B are visible from the Frosty Viewpoint. Unit 7B is visible at and oblique angle from the Seward Viewpoint.

Mitigation: In 7A, design retention to mitigate visual concerns. Design patch units to blend in with the landscape.

Layout and Contract Concerns: Stream protection, visuals, steep slopes.

Mitigation Measures: 7A: F2, W1, V1.

Mitigation Measures: 7B: F2, F4, F5, W3, V3.

93 ACRES

ALTERNATIVE 3

UNIT 7AB



Class I Streams

Class II Streams

Class III Streams

Class IV Streams

Proposed Roads –Alt 2 only

Proposed Roads –Alts 2 and 3

Proposed Non-system Roads



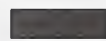
Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



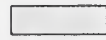
Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
3	Clearcut	10	Cable	7A
3	Patch Cut	75	Helicopter	7B

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 4 Medium 53 High 0 Net Volume (MBF/Acre): 19 MBF

Unit Development & Stand Description

Species composition is 63% hemlock, 11% Sitka spruce, 24% yellow-cedar, 2% western redcedar. Unit is planned for helicopter yarding with 25% of the trees retained within the unit for visuals and wildlife. Retention will be scattered throughout the unit.

Alt. 4

Treatment	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	25% Trees/Ac
% Volume Removed	92%
Leave trees for Marten	No
Harvest Acres	57
Harvest Volume (MBF)	996
Cable Logging System Acres	None
Helicopter Logging System Acres	57
Yarded To	Barge

Stand Management Objectives:

Desired future condition for this is having multiple canopy layers. Stand will be predominately uneven-aged. 25% of the trees per acre (over 9" dbh.) will be retained to meet visual quality objectives and to provide structure. Strive to leave large, low-value trees and small, vigorous trees. Retention shall be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit may contain Class IV tributaries to marine waters.

Mitigation: Verify Class IV streams in unit. Helicopter yarding ensures adequate suspension over streams.

Soils

Concern: Harvest on unmapped oversteepened slopes.

Mitigation: Layout unit to avoid slopes over 72%, unless verified by Soil Scientist prior to layout.

Wildlife

Concern: Wildlife habitat

Mitigation: 25% retention will provide structure for wildlife.

Visuals

Concern: Meet the Modification VQO. This unit is visible from the Frosty Viewpoint.

Mitigation: Proposed 25% retention scattered throughout the unit will mitigate visual concerns.

Layout and Contract Concerns: Stream protection, visuals, steep slopes.

Mitigation Measures: F2, F4, F5, W2, V2.

57 ACRES

ALTERNATIVE 4

UNIT 7C



Class I Streams

Class II Streams

Class III Streams

Class IV Streams



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



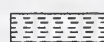
Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
4	Overstory Removal	25	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 1 Medium 19 High 8 Net Volume (MBF/Acre): 23 MBF

Unit Development & Stand Description

Species composition is 75% hemlock, 25% yellow-cedar, 0% western redcedar. All alternatives propose 15% retention. In Alternative 2, retention will be concentrated in high value marten habitat using clumps or scattered throughout the stand. Retention would be scattered throughout the unit in Alternatives 3, 4, and 6. Unit is planned for cable yarding in Alternative 2. Unit would be helicopter yarded in Alternatives 3, 4, and 6. Logs would be yarded to the road in Alternative 3, and to a barge in Alternatives 4 and 6. The unit contains 8 acres of high value marten habitat.

	Alt. 2	Alt. 3	Alt. 4 & 6
Treatment	Clearcut with Reserves	Overstory Removal	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	15% Ac	15% Trees/Ac	15% Trees/Ac
% Volume Removed	85%	95%	95%
Leave trees for Marten	Yes	Yes	Yes
Harvest Volume (MBF)	548	615	615
Cable Logging System Acres	24	None	None
Helicopter Logging System Acres	None	28	28
Yarded To	Road	Road	Barge

Stand Management Objectives:

Alternative 2 - Desired future condition for this stand is predominately even-aged management with reserve clumps and scattered trees. Trees are being retained to meet visual quality objectives, marten guidelines, and to provide structure for wildlife. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 to 110-180 trees per acre.

Alternatives 3, 4, and 6 - Desired future condition for this is having two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives, meet marten guidelines, and to provide structure for wildlife. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit contains unmapped Class III or IV streams tributary to marine waters.

Mitigation: Verify stream location within unit. No timber harvest within notch of Class III streams. Alt. 2 - Ensure unit design provides adequate suspension over Class IV streams. Alts. 3, 4, and 6 - Helicopter yarding ensures adequate suspension over streams.

Soils

Concern: None

Mitigation:

Wildlife

Concern: Unit has 8 acres of high value marten habitat.

Mitigation: Forest Plan marten standards for retention and forest structure.

Visuals

Concern: Meet the Modification VQO. This unit is visible from the Frosty and Seward Viewpoint.

Mitigation: Alternative 2 - Design retention to mitigate visual concerns where possible. Alternatives 3, 4, and 6 - scattered retention and size of unit will help to mitigate visual concerns.

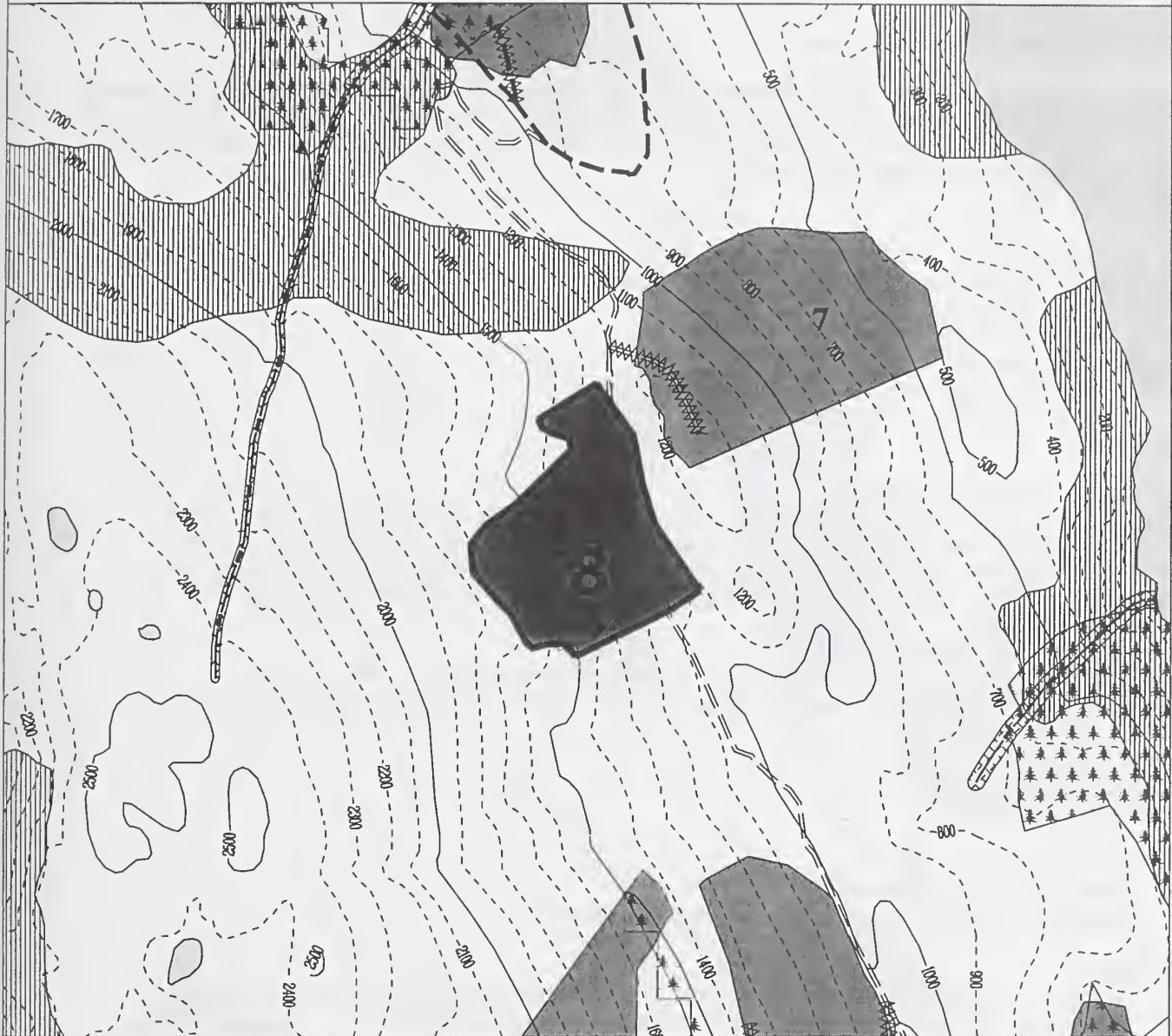
Layout and Contract Concerns: Stream protection, marten, visuals.

Mitigation Measures: F2, W1, W2, W16, V1, V2.

28 ACRES

ALTERNATIVE 2 3 4 6

UNIT 8



Class I Streams

Class II Streams

Class III Streams

Class IV Streams

Proposed Roads -Alt 2 only

Proposed Roads -Alts 2 and 3

Proposed Non-system Roads



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
2	Clearcut	15	Cable	
3 4 6	Overstory Removal	15	Helicopter	Alts 4 & 6 no roads

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Kuakan EIS**Unit Number 9****Treatment Acres 23**

Volstrata Acres: Low 0 Medium 3 High 20 Net Volume (MBF/Acre): 28 MBF

Unit Development & Stand Description

Species composition is 76% hemlock, 24% Sitka spruce. Unit is planned for helicopter yarding with 15% of the trees retained, scattered throughout the unit, for visuals and wildlife habitat. Logs would be yarded to the road in Alternatives 2 and 3, and to a barge in Alternative 4. Although 20 acres are in high volstrata, less than 2 acres are below 1,500 feet in elevation; therefore marten standards do not apply.

	Alt. 2	Alt. 3	Alt. 4
Treatment	Overstory Removal	Overstory Removal	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	15% Trees/Ac	15% Trees/Ac	15% Trees/Ac
% Volume Removed	96%	96%	96%
Leave trees for Marten	No	No	No
Harvest Volume (MBF)	618	618	618
Cable Logging System Acres	None	None	None
Helicopter Logging System Acres	23	23	23
Yarded To	Road	Road	Barge

Stand Management Objectives:

Desired future condition for this is having two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives and to provide structure. Retention will be left until until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit may contain Class IV streams tributary to marine waters.

Mitigation: Verify streams within unit. Helicopter yarding ensures adequate suspension over streams.

Soils

Concern: None

Mitigation:

Wildlife

Concern: Wildlife habitat

Mitigation: 15% retention will provide structure for wildlife.

Visuals

Concern: Meet the Modification VQO. This unit is visible from the Frosty and Seward Viewpoints.

Mitigation: Proposed size and 15% retention will help to mitigate visual concerns.

Layout and Contract Concerns: Stream protection.

Mitigation Measures: F2, W2, V2.



Class I Streams

Class II Streams

Class III Streams

Class IV Streams

Proposed Roads -Alt 2 only

Proposed Roads -Alts 2 and 3

Proposed Non-system Roads



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
2 3 4	Overstory Removal	15	Helicopter	Alts 3 & 4 no roads

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Kuakan EIS**Unit Number 10****Treatment Acres 35**

Volstrata Acres: Low 2 Medium 30 High 3 Net Volume (MBF/Acre): 24 MBF

Unit Development & Stand Description

Species composition is 38% hemlock, 4% Sitka spruce, 54% yellow-cedar, 4% western redcedar. Alternatives propose 10-15% retention. In Alternative 2, retention will be concentrated in high value marten habitat in clumps or scattered throughout the stand. Retention would be scattered throughout the unit in Alternatives 3 and 4. Unit is planned for cable yarding in Alternative 2. Unit would be helicopter yarded in Alternatives 3 and 4. Logs would be yarded to the road in Alternative 3, and to a barge in Alternative 4. The unit contains 3 acres of high value marten habitat.

	Alt. 2	Alt. 3	Alt. 4
Treatment	Clearcut with Reserves	Overstory Removal	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	10% Ac	15% Trees/Ac	15% Trees/Ac
% Volume Removed	88%	96%	96%
Leave trees for Marten	Yes	Yes	Yes
Harvest Volume (MBF)	743	805	805
Cable Logging System Acres	31	None	None
Helicopter Logging System Acres	None	35	35
Yarded To	Road	Road	Barge

Stand Management Objectives:

Alternative 2 - Desired future condition for this stand is predominately even-aged management with reserve clumps and scattered trees. Trees are being retained to meet visual quality objectives, marten guidelines, and to provide structure for wildlife. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-30 to 110-180 trees per acre.

Alternatives 3 and 4 - Desired future condition for this stand is two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives, meet marten guidelines, and to provide structure for wildlife. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit may contain Class IV streams tributary to marine waters.

Mitigation: Verify streams within unit. Alt 2 - Ensure unit design provides adequate suspension over streams during yarding. Alt 3 and 4 - Helicopter yarding ensures adequate suspension over streams.

Soils

Concern: None

Mitigation:

Wildlife

Concern: Unit contains 3 acres of high value marten habitat

Mitigation: Follow Forest Plan marten standards for retention of 7 trees/acre and forest structure.

Visuals

Concern: Meet the Modification VQO. This unit is visible at oblique angles from the Frosty and Seward Viewpoints.

Mitigation: Topographic features screen the lower part of the unit, which helps to mitigate visual concerns. Proposed retention will further mitigate visual concerns.

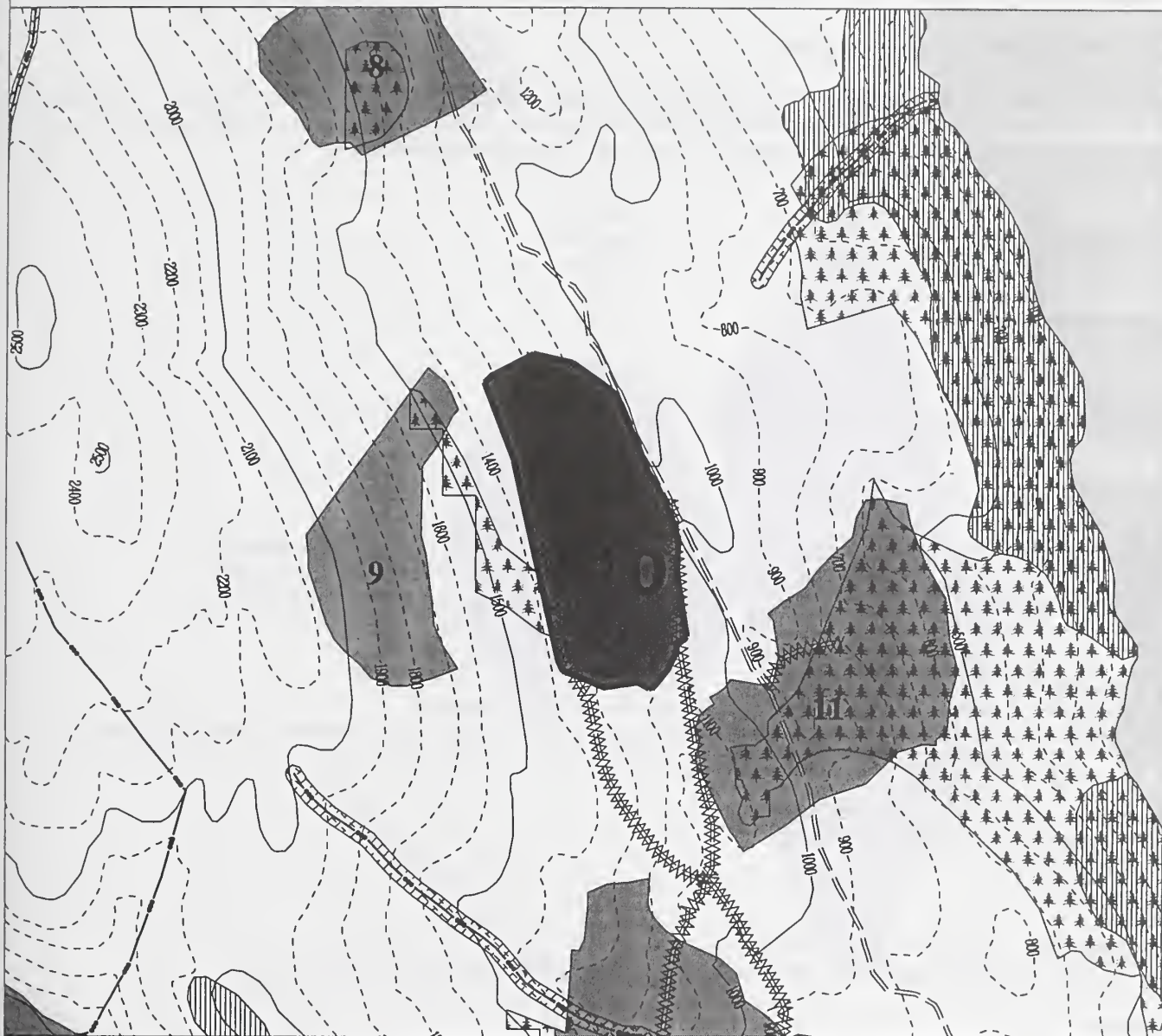
Layout and Contract Concerns: Stream protection, marten, and visuals.

Mitigation Measures: F2, W1, W2, W16, V1, V2.

35 ACRES

ALTERNATIVE 2 3 4

UNIT 10



Class I Streams

Class II Streams

Class III Streams

Class IV Streams

Proposed Roads -Alt 2 only

Proposed Roads -Alts 2 and 3

Proposed Non-system Roads



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
2	Clearcut	15	Cable	
3 4	Overstory Removal	15	Helicopter	no roads

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Unit Development & Stand Description

Species composition is 52% hemlock, 11% Sitka spruce, 35% yellow-cedar, 2% western redcedar. . Unit 10A is 58 acres, will be helicopter yarded and have approximately 25% of the stand treated in patches up to 10 acres in size. In patches over 2 acres that are located in the high volstrata below 1500 feet elevation leave trees for marten.

	Alt. 6
Treatment	Patch Cut
% Retention of Ac, Trees/Ac or Vol	75% Ac
% Volume Removed	25%
Leave trees for Marten	Yes
Harvest Acres	15
Harvest Volume (MBF)	353
Cable Logging System Acres	None
Helicopter Logging System Acres	15
Yarded To	Barge

Stand Management Objectives:

Future stand will be multiple-aged. Overall stand will be uneven-aged, but the patches will be managed as even-aged. 75% of the stand is being retained to meet visual quality objectives and to provide structure. Natural regeneration is expected. Future stand treatments may include; planting of Sitka spruce or yellow-cedar, or pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

- Concern: Unit may contain Class IV streams tributary to marine waters.
- Mitigation: Verify streams within unit. Helicopter yarding will ensure adequate suspension over streams during yarding.

Soils

- Concern: None
- Mitigation:

Wildlife

- Concern: High value marten habitat.
- Mitigation: Follow Forest Plan marten standards for retention of 7 trees/acre and forest structure.

Visuals

- Concern: Meet the Modification VQO. This unit is visible at oblique angles from the Frosty and Seward Viewpoints.
- Mitigation: Topographic features screen the lower part of the unit, which helps to mitigate visual concerns. Leave tree marking and reserves for marten will further mitigate visual concerns.

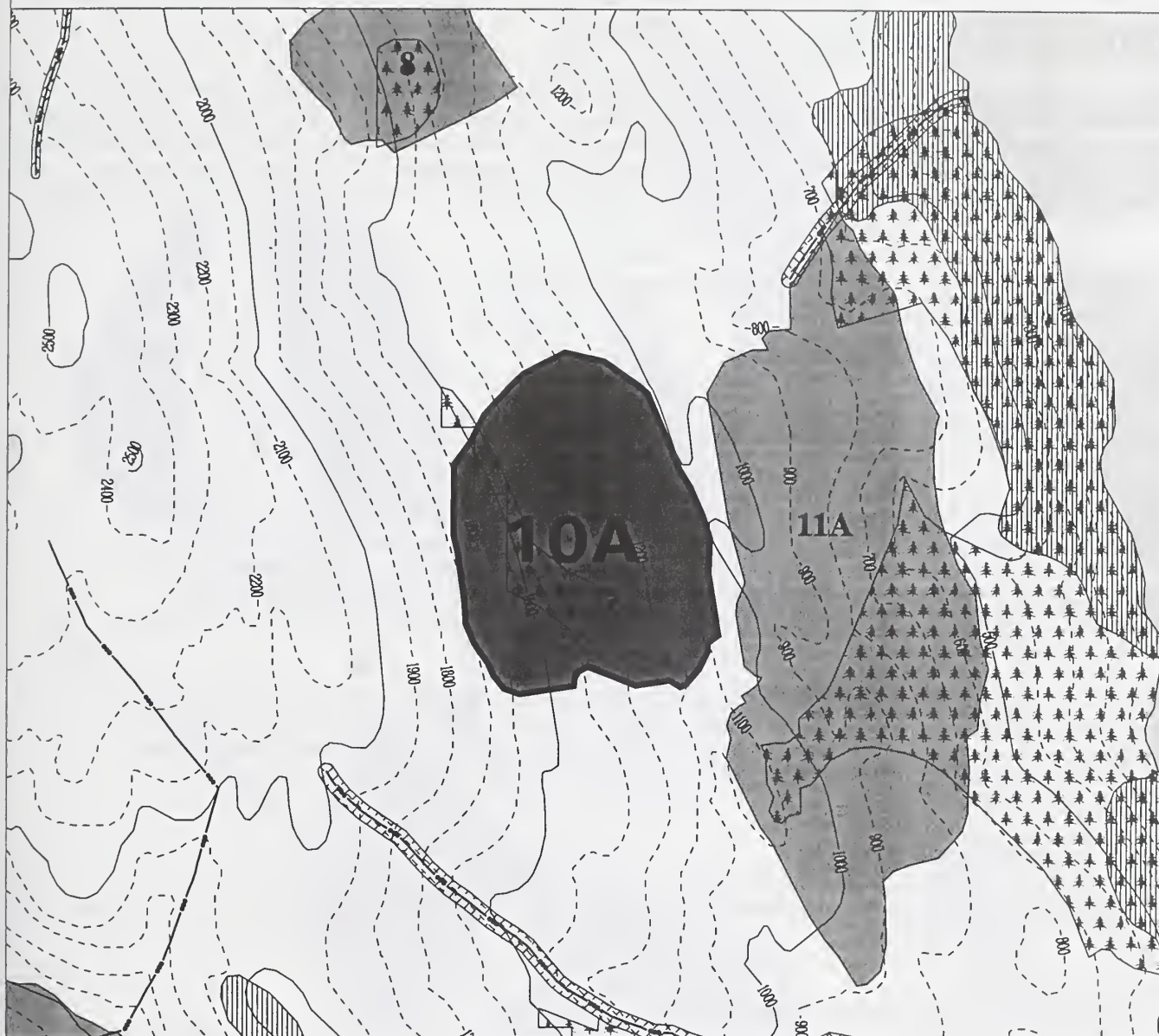
Layout and Contract Concerns: Patch size, marten standards, visuals and stream protection.

Mitigation Measures: F2, W3, W16, V3.

58 ACRES

ALTERNATIVE 6

UNIT 10A



Class I Streams
Class II Streams
Class III Streams
Class IV Streams



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



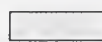
Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
6	Patch Cut	75	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 3 Medium 12 High 27 Net Volume (MBF/Acre): 24 MBF

Unit Development & Stand Description

Species composition is 38% hemlock, 5% Sitka spruce, 38% yellow-cedar, 19% western redcedar. Unit is planned for helicopter yarding in Alternative 3 and cable yarding in Alternative 2. Ensure east side of unit is located outside of beach buffer. In Alternative 3 groups will be helicopter yarded and will not exceed 2 acres in size. Follow wildlife concerns listed below. Alternative 2 will cable yard the volume to the road system and alternative 3 will yard the volume to a barge. Alternative 2 will need trees left for marten. The small openings in Alternative 3 will not need additional trees for marten.

	Alt. 2	Alt. 3
Treatment	Clearcut with Reserves	Group Selection
% Retention of Ac, Trees/Ac or Vol	15% Ac	75% Ac
% Volume Removed	84%	25%
Leave trees for Marten	Yes	No
Harvest Volume (MBF)	851	264
Cable Logging System Acres	36	None
Helicopter Logging System Acres	None	11
Yarded To	Road	Barge

Stand Management Objectives:

Alternative 2 - Desired future condition for this stand is predominately even-aged management with reserve clumps and scattered trees. Trees are being retained to meet visual quality objectives, marten guidelines, and to provide structure for wildlife. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-30 to 110-180 trees per acre.

Alternative 3 - Desired future condition for this stand is having multiple canopy layers. Stand will be uneven-aged, but the groups will be managed as even-aged. 75% of the stand is being retained to meet visual quality objectives and to provide structure for wildlife. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, or pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit may contain Class IV streams tributary to marine waters.

Mitigation: Verify streams within unit and ensure unit design provides adequate suspension over streams during yarding.

Soils

Concern: Old landslide tracks on this slope.

Mitigation: Unit layout will avoid slopes over 72%. Uphill yarding with partial suspension will minimize disturbance in eastern side of the unit.

Wildlife

Concern: Adult goshawk seen perched within this stand. High value marten habitat. Eagle nest southeast of unit.

Mitigation: Small openings in Alternative 3 and 75% retention will maintain high canopy cover and foraging habitat. Follow Forest Plan marten standards for retention of 7 trees/acre and forest structure in Alternative 2.

Visuals

Concern: Meet the Modification VQO. This unit is visible at an oblique angle from the Frosty Viewpoint, and partially visible from the Seward Viewpoint.

Mitigation: The irregular outline of the unit helps to blend it into the landscape. Retention within the unit will further mitigate visual concerns.

Layout and Contract Concerns: Marten, eagle nest timing restriction, group size, visuals, and stream protection.

Mitigation Measures: F2, F5, W1, W4, W6, W10, W16, V1, V4.



- | | | | | | |
|--|-------------------------------|--|------------------|--|-----------------------------|
| | Class I Streams | | Eagle Nest Tree | | Proposed cut unit |
| | Class II Streams | | Riparian Buffers | | Adjacent proposed units |
| | Class III Streams | | TTRA Buffers | | Marten Guidelines Apply |
| | Class IV Streams | | | | Existing Harvest Units |
| | Proposed Roads - Alt 2 only | | | | High Hazard Soils |
| | Proposed Roads - Alts 2 and 3 | | | | Saltwater and Lakes |
| | Proposed Non-system Roads | | | | 1/4 Mile Eagle Nest Buffers |

Alternative	Prescription	Retention	Harvest System	Comments
2	Clearcut	15	Cable	
3	Group Selection	75	Helicopter	no roads

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 10 Medium 69 High 31 Net Volume (MBF/Acre): 24 MBF

Unit Development & Stand Description

Species composition is 38% hemlock, 5% Sitka spruce, 38% yellow-cedar, 19% western redcedar. Unit is planned for helicopter yarding. Ensure east side of unit is located outside of beach buffer. Groups will not exceed 2 acres in size and will follow wildlife concerns listed below. The volume will be yarded to a barge. The small openings will not need additional trees for marten.

Alt. 6

Treatment	Group Selection
% Retention of Ac, Trees/Ac or Vol	75% Ac
% Volume Removed	25%
Leave trees for Marten	No
Harvest Acres	28
Harvest Volume (MBF)	672
Cable Logging System Acres	None
Helicopter Logging System Acres	28
Yarded To	Barge

Stand Management Objectives:

Future stand will be multiple-aged. Overall stand will be uneven-aged, but the groups will be managed as even-aged. 75% of the stand is being retained to meet visual quality objectives and to provide structure. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, or pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit may contain Class IV streams tributary to marine waters.

Mitigation: Verify streams within unit. Helicopter yarding provides adequate suspension over streams.

Soils

Concern: Harvest on unmapped oversteepened slopes.

Mitigation: Locate harvest groups to avoid steep slopes.

Wildlife

Concern: Adult goshawk seen perched within this stand. High value marten habitat.

Mitigation: Small openings and 75% retention will maintain high canopy cover and foraging habitat. Follow Forest Plan marten standards for retention for forest structure.

Visuals

Concern: Meet the Modification VQO. This unit is visible at an oblique angle from the Frosty Viewpoint, and partially visible from the Seward Viewpoint.

Mitigation: The irregular outline of the unit helps to blend it into the landscape. 75% retention within the unit will further mitigate visual concerns.

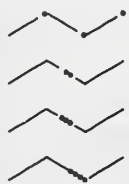
Layout and Contract Concerns: Marten, beach buffer, group size, visuals, and stream protection.

Mitigation Measures: F2, F4, W4, W6, W10, W16, V4.

110 ACRES

ALTERNATIVE 6

UNIT 11A



Class I Streams
Class II Streams
Class III Streams
Class IV Streams



Eagle Nest Tree



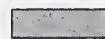
Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



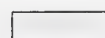
Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
6	Group Selection	75	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 1 Medium 2 High 46 Net Volume (MBF/Acre): 25 MBF

Unit Development & Stand Description

Species composition is 73% hemlock, 11% Sitka spruce, 13% yellow-cedar, 3% western redcedar. Unit is planned for helicopter yarding. Most of this unit is thought to have a wind disturbance history. In Alternative 3, groups will not exceed 2 acres in size and will follow water quality and wildlife concerns listed below. Alternative 4 and 6 will need trees left for marten.

	Alt. 3	Alt. 4	Alt. 6
Treatment	Group Selection	Overstory Removal	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	75% Ac	25% Trees/Ac	15% Trees/Ac
% Volume Removed	25%	90%	96%
Leave trees for Marten	No	Yes	Yes
Harvest Volume (MBF)	300	1104	1153
Cable Logging System Acres	None	None	None
Helicopter Logging System Acres	12	32	49
Yarded To	Barge	Barge	Barge

Stand Management Objectives:

Alternative 3 - Desired future condition for this stand is having multiple-canopy layers. Stand will be uneven-aged, but the groups will be managed as even-aged. 75% of the stand is being retained to meet visual quality objectives and to provide structure for wildlife. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, or pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Alternatives 4 and 6 - Desired future condition for this is having two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives, meet marten guidelines, and to provide structure for wildlife. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre. Residual trees might blow down over time.

Water Quality & Fisheries

Concern: Unit contains Class III and IV streams tributary to marine waters. Stream process group is HC. Stand has history of windthrow.

Mitigation: No timber harvest within notch of Class III streams. Layout will extend buffer beyond notch or provide other reasonable assurance of windfirmness within the buffer. Helicopter yarding provides adequate suspension over Class IV streams.

Soils

Concern: None

Mitigation:

Wildlife

Concern: Wildlife travel corridor along stream. High value marten habitat. Eagle nest southeast of unit.

Mitigation: Place reserves and leave trees along stream to enhance corridor value. Follow Forest Plan marten standards for retention of 7 trees/acre and forest structure. Timing restriction for flight paths if within eagle nest buffer.

Visuals

Concern: Meet the Modification VQO. This unit is visible from the Frosty and Seward Viewpoints.

Mitigation: Proposed retention in all alternatives will help to mitigate visual concerns.

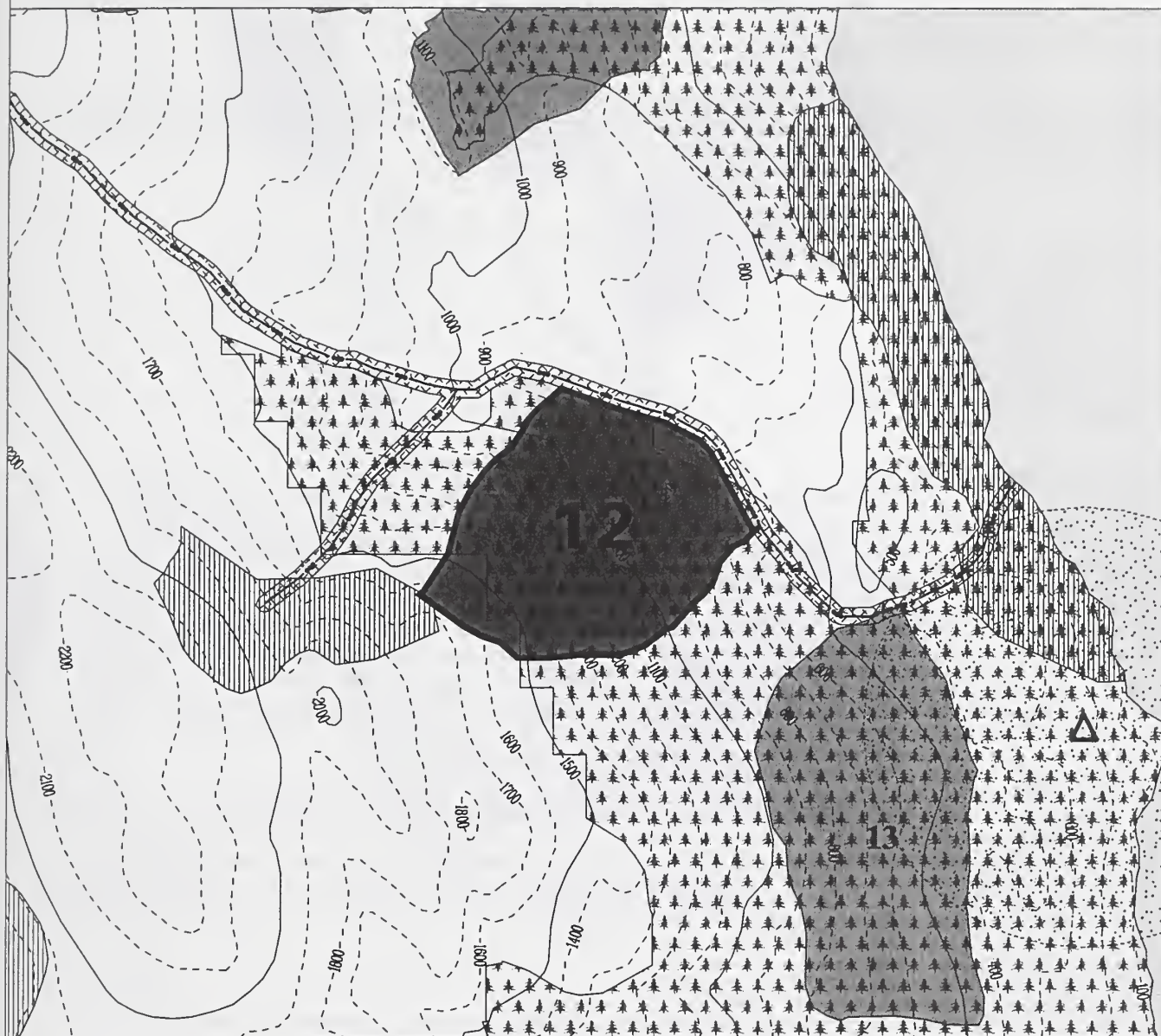
Layout and Contract Concerns: Marten, visuals, eagle nest timing restriction, stream protection, and buffer windfirmness. In Alternative 6, avoid wrapping west boundary around to north-facing ridge (shift unit to south).

Mitigation Measures: F1, F2, W2, W4, W6, W10, W16, V2, V4.

49 ACRES

ALTERNATIVE 3 4 6

UNIT 12



Class I Streams

Class II Streams

Class III Streams

Class IV Streams

Proposed Roads -Alt 2 only

Proposed Roads -Alts 2 and 3

Proposed Non-system Roads



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
3	Group Selection	75	Helicopter	
4	Overstory Removal	25	Helicopter	
6	Overstory Removal	15	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 20 Medium 2 High 10 Net Volume (MBF/Acre): 25 MBF

Unit Development & Stand Description

Species composition is 73% hemlock, 11% Sitka spruce, 13% yellow-cedar, 3% western redcedar. Unit is planned for helicopter yarding in Alternative 4 and cable yarding in Alternative 2. Both alternatives will need trees left for marten. Ensure adequate buffer along the stream along the south east side of unit.

	Alt. 2	Alt. 4
Treatment	Clearcut with Reserves	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	10% Ac	25% Tree/Ac
% Volume Removed	90-98%	91%
Leave trees for Marten	Yes	Yes
Harvest Volume (MBF)	784	731
Cable Logging System Acres	32	None
Helicopter Logging System Acres	None	32
Yarded To	Road	Barge

Stand Management Objectives:

Alternative 2 - Stand will be predominately even-aged with reserve clumps and scattered trees. Trees are being retained to meet visual quality objectives, marten guidelines, and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-30 to 110-180 trees per acre.

Alternatives 4 - Desired future condition for this is having two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives, meet marten guidelines, and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit contains Class III and IV streams tributary to marine waters. High stream density in and adjacent to unit.

Mitigation: No timber harvest within notch of Class III streams. Retain trees beyond stream buffers to improve windfirmness of buffer. Layout roads and landings to minimize stream crossings and ensure adequate suspension over Class IV streams during yarding.

Soils

Concern: Steep, devils club shoot slopes in unit.

Mitigation: Design unit to provide partial suspension, to the extent possible, to minimize soil disturbance.

Wildlife

Concern: Wildlife travel corridor along stream. High value marten habitat. Eagle nest southeast of unit.

Mitigation: Place reserves and leave trees along stream to enhance corridor value. Follow Forest Plan marten standards for retention of 7 trees/acre and forest structure.

Visuals

Concern: Meet the Modification VQO. This unit is visible at oblique angles from the Frosty and Seward Viewpoints.

Mitigation: Proposed retention within unit will help mitigate visual concerns.

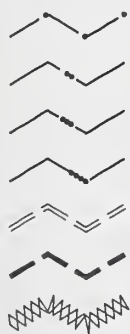
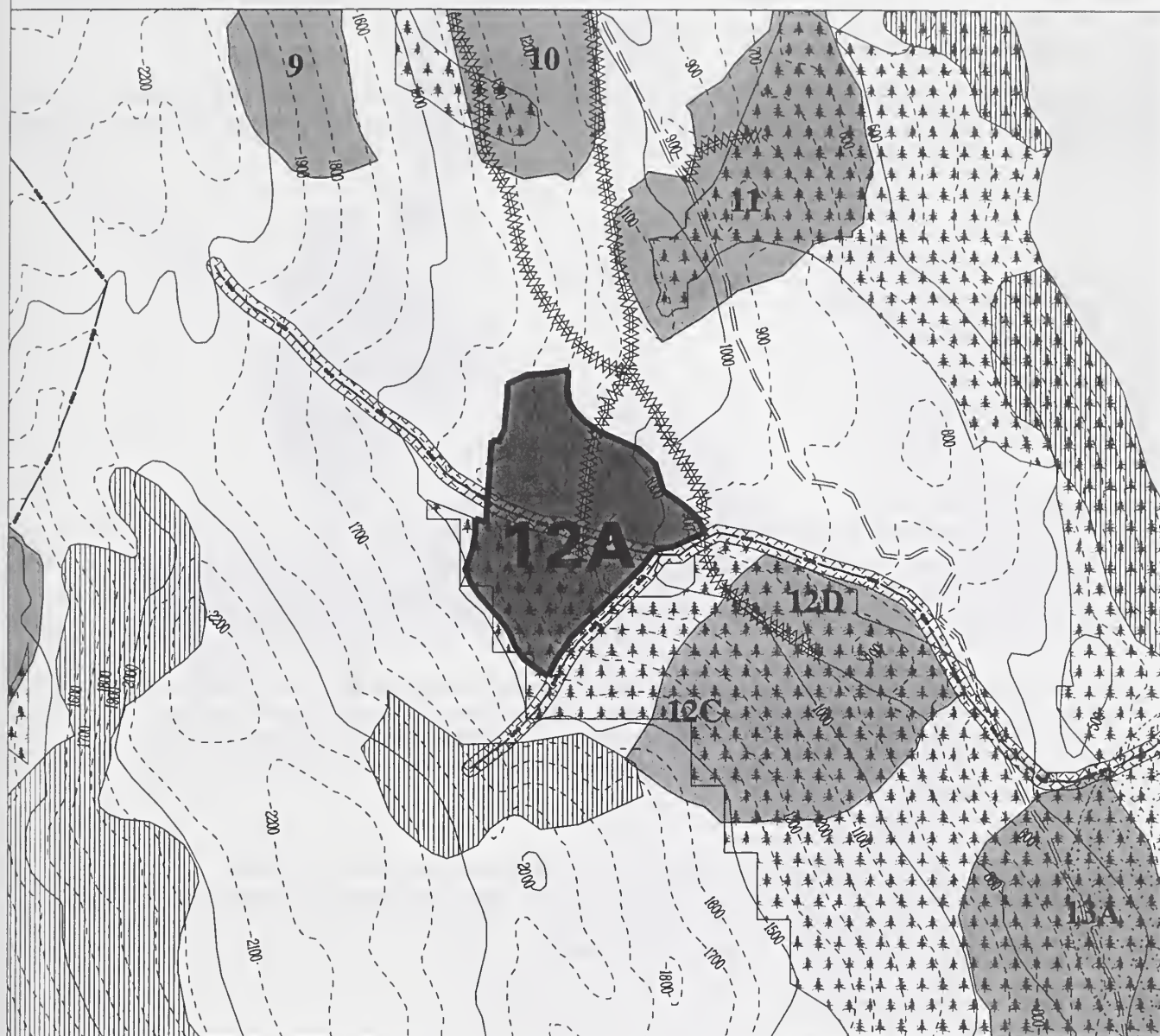
Layout and Contract Concerns: Marten, visuals, stream protection, suspension. Eagle nest timing restrictions in Alternative 4.

Mitigation Measures: F1, F2, F4, F5, W1, W2, W6, W10, W16, V1, V2.

32 ACRES

ALTERNATIVE 2 4

UNIT 12A



Class I Streams

Class II Streams

Class III Streams

Class IV Streams

Proposed Roads -Alt 2 only

Proposed Roads -Alts 2 and 3

Proposed Non-system Roads



Eagle Nest Tree



Riparian Buffers



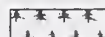
TTRA Buffers



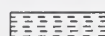
Proposed cut unit



Adjacent proposed units



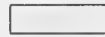
Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
2	Clearcut	10	Cable	
4	Overstory Removal	25	Helicopter	no roads

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 0 Medium 2 High 46 Net Volume (MBF/Acre): 25 MBF

Unit Development & Stand Description

Species composition is 73% hemlock, 11% Sitka spruce, 13% yellow-cedar, 3% western redcedar. Unit 12C will be yarded by helicopter. Unit 12D will be cable yarded with 10% (1 acre) retained. Both units will need trees left for marten. Ensure adequate buffer along the stream along the east side of the unit.

Alt. 2

	12C	12D
Treatment	Overstory Removal	Clearcut with Reserves
% Retention of Ac, Trees/Ac or Vol	25% Trees/Ac	10% Ac
% Volume Removed	90%	91%
Leave trees for Marten	Yes	Yes
Harvest Volume (MBF)	765	319
Cable Logging System Acres	None	13
Helicopter Logging System Acres	34	None
Yarded To	Road	Road

Stand Management Objectives:

12C - Desired future condition for this stand is having two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives, meet marten guidelines, and to provide structure for wildlife. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

12D - Desired future condition for this stand is predominately even-aged management with reserve clumps and scattered trees. Trees are being retained to meet visual quality objectives, marten guidelines, and to provide structure for wildlife. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-30 to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit contains Class III and IV streams tributary to marine waters. Buffer windthrow.

Mitigation: No timber harvest within notch of Class III streams. Retain additional trees beyond buffer to provide assurance of buffer windfirmness. Locate roads and landings to ensure that unit design provides adequate suspension over streams during yarding.

Soils

Concern: None

Mitigation:

Wildlife

Concern: Wildlife travel corridor along stream. Increase value marten habitat.

Mitigation: Place reserves and leave trees along stream to enhance corridor value. Follow Forest Plan marten standards for retention of 7 trees/acre and forest structure.

Visuals

Concern: Meet the Modification VQO. This unit is visible at oblique angles from the Frosty and Seward Viewpoints.

Mitigation: Proposed retention within unit will help mitigate visual concerns.

Layout and Contract Concerns: Marten, visuals, and stream protection.

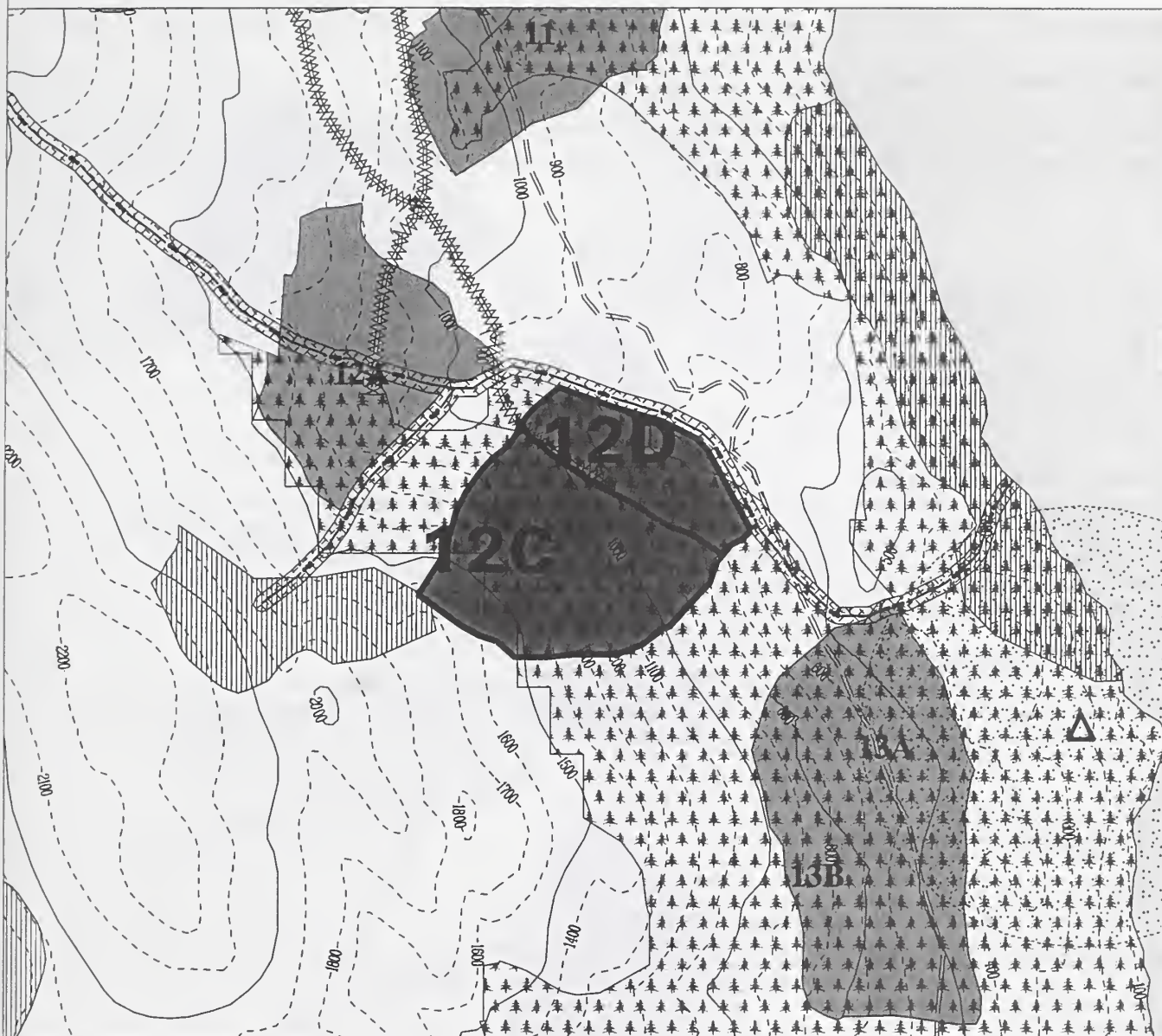
Mitigation Measures: 12C: F2, W2, W16, V2.

Mitigation Measures: 12D: F1, F2, W1, W16, V1.

49 ACRES

ALTERNATIVE 2

UNIT 12CD



Class I Streams

Class II Streams

Class III Streams

Class IV Streams

Proposed Roads -Alt 2 only

Proposed Roads -Alts 2 and 3

Proposed Non-system Roads



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
2	Overstory Removal	25	Helicopter	12C
2	Clearcut	10	Cable	12D

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 0 Medium 0 High 57 Net Volume (MBF/Acre): 28 MBF

Unit Development & Stand Description

Species composition is 66% hemlock, 9% Sitka spruce, 25% western redcedar. Leave trees for marten. Ensure adequate beach buffer along the east side of the unit. Portions of this unit are thought to have a wind disturbance history.

	Alt. 3	Alt. 4
Treatment	Overstory Removal	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	25% Trees/Ac	25% Trees/Ac
% Volume Removed	90%	90%
Leave trees for Marten	Yes	Yes
Harvest Volume (MBF)	1436	1436
Cable Logging System Acres	None	None
Helicopter Logging System Acres	57	57
Yarded To	Barge	Barge

Stand Management Objectives:

Desired future condition for this is having two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives, meet marten guidelines, and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre. Residual trees may eventually blow down, especially along southwest boundary.

Water Quality & Fisheries

Concern: Unit contains Class III and IV streams tributary to marine waters. Windthrow.

Mitigation: No timber harvest within notch of Class III streams. Layout buffers to minimize risk of windthrow. Ensure that unit design provides adequate suspension over Class IV streams during yarding.

Soils

Concern: None

Mitigation:

Wildlife

Concern: Eagle nest on adjacent beach. High value marten habitat.

Mitigation: Follow MOU direction to avoid helicopter or ground disturbance within the nest buffer. Follow Forest Plan marten standards for retention of 7 trees/acre and forest structure.

Visuals

Concern: Meet the Modification VQO. This unit is viewed straight on from the Seward Viewpoint, and at oblique angles from the Frosty and Santa Anna Viewpoints.

Mitigation: The 25% retention strategy will help to mitigate the visual concern for this unit.

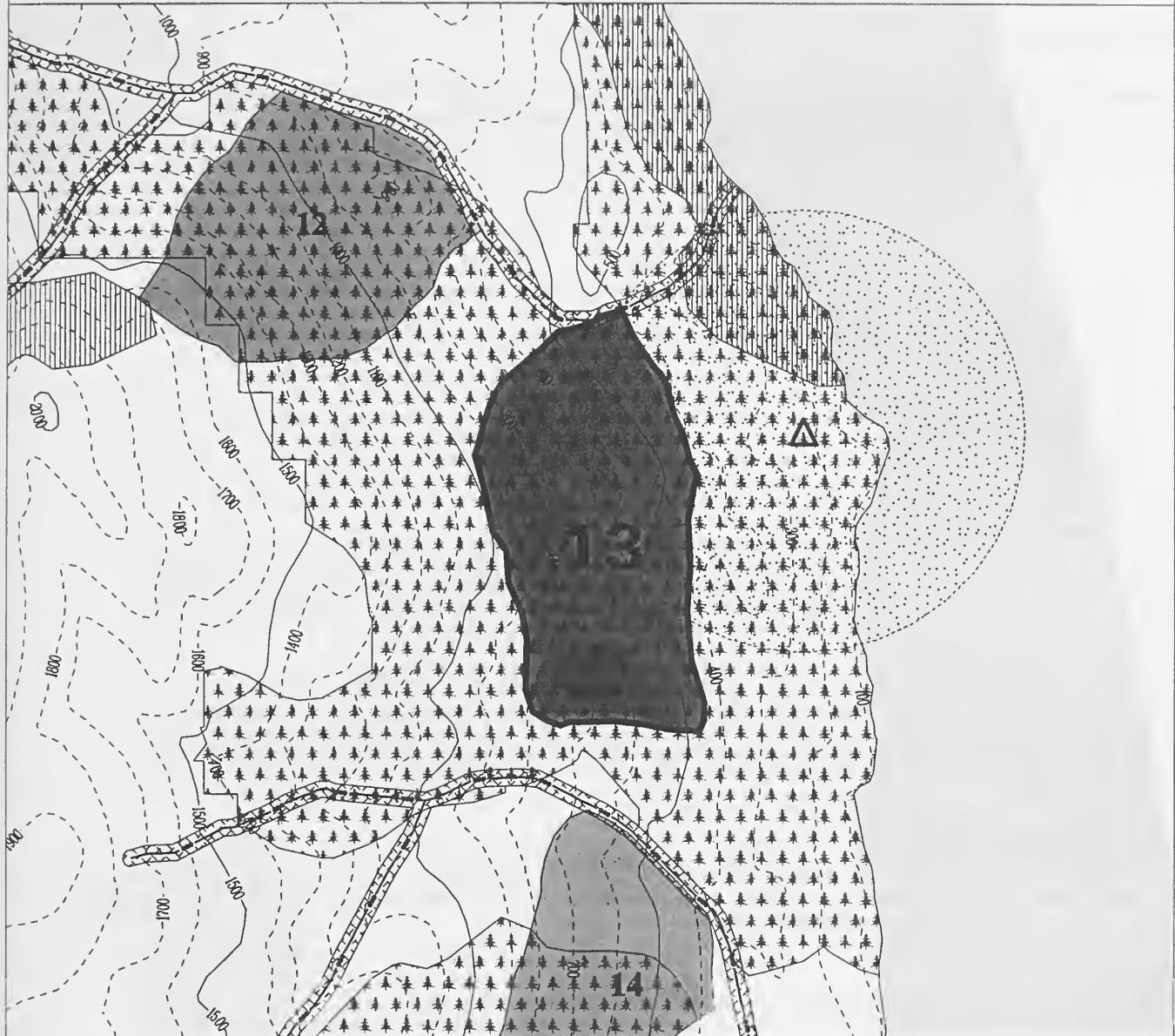
Layout and Contract Concerns: Marten, visuals, timing restriction for eagles, and stream protection.

Mitigation Measures: F1, F2, W2, W6, W10, W16, V2.

57 ACRES

ALTERNATIVE 3 4

UNIT 13



- | | | | | | |
|--|------------------------------|--|------------------|--|-----------------------------|
| | Class I Streams | | Eagle Nest Tree | | Proposed cut unit |
| | Class II Streams | | Riparian Buffers | | Adjacent proposed units |
| | Class III Streams | | TTRA Buffers | | Marten Guidelines Apply |
| | Class IV Streams | | | | Existing Harvest Units |
| | Proposed Roads -Alt 2 only | | | | High Hazard Soils |
| | Proposed Roads -Alts 2 and 3 | | | | Saltwater and Lakes |
| | Proposed Non-system Roads | | | | 1/4 Mile Eagle Nest Buffers |

Alternative	Prescription	Retention	Harvest System	Comments
3 4	Overstory Removal	25	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 0 Medium 0 High 57 Net Volume (MBF/Acre): 28 MBF

Unit Development & Stand Description

Species composition is 66% hemlock, 9% Sitka spruce, 25% western redcedar. Unit 13A is 43 acres and will be cable yarded with 20% (9 acres) retained. Unit 13B is 14 acres and planned for helicopter yarding. Both units will need trees left for marten. Ensure adequate beach buffer along the east side of the unit. Portions of this unit are thought to have a wind disturbance history.

Alt. 2

	13A	13B
Treatment	Clearcut with Reserves	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	20% Ac	25% Trees/Ac
% Volume Removed	77%	90%
Leave trees for Marten	Yes	Yes
Harvest Volume (MBF)	928	353
Cable Logging System Acres	34	None
Helicopter Logging System Acres	None	14
Yarded To	Road	Road

Stand Management Objectives:

13A - Stand will be predominately even-aged with reserve clumps and scattered trees. Trees are being retained to meet visual quality objectives, marten guidelines, and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-30 to 110-180 trees per acre.

13B - Desired future condition for this is having two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives, meet marten guidelines, and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit is adjacent to Class III (HC) stream tributary to marine waters. Windthrow.

Mitigation: No harvest within notch adjacent to Class III stream. Retain additional trees beyond buffer to provide some assurance of buffer windfirmness.

Soils

Concern: Harvest on unmapped oversteepened slopes.

Mitigation: Layout unit to provide partial suspension, to the extent possible, in northwest portion of unit.

Wildlife

Concern: Eagle nest location on adjacent beach. High value marten habitat.

Mitigation: Follow MOU direction to avoid helicopter or ground disturbance within the nest buffer. Follow Forest Plan marten standards for retention of 7 trees/acre and forest structure.

Visuals

Concern: Meet the Modification VQO. These units are viewed straight on from the Seward Viewpoint, and at oblique angle from the Frosty and Santa Anna Viewpoints.

Mitigation: The higher level of retention (20%) will help to mitigate the size of 13A. 13B's small size and 25% retention strategy will mitigate visual concerns for this unit. Leave trees between 13A and 13B to blend unit boundaries.

Layout and Contract Concerns: Marten, visuals, eagle nest timing restrictions, and stream protection.

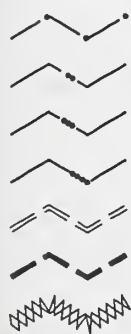
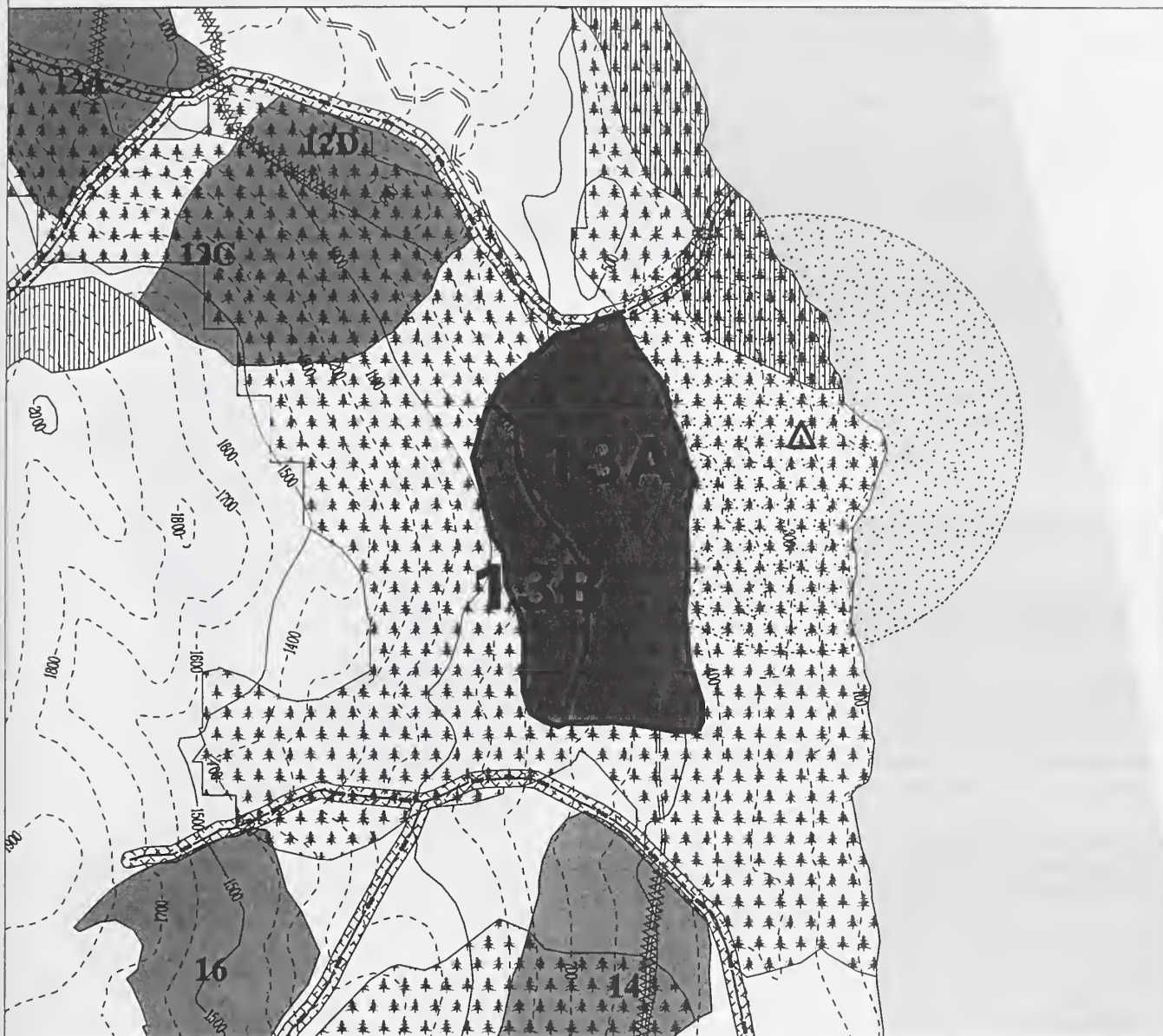
Mitigation Measures: 13A: F1, F2, F5, W1, W6, W10, W16, V1.

Mitigation Measures: 13B: F1, F2, F5, W2, W6, W10, W16, V2.

57 ACRES

ALTERNATIVE 2

UNIT 13AB



Class I Streams

Class II Streams

Class III Streams

Class IV Streams

Proposed Roads -Alt 2 only

Proposed Roads -Alts 2 and 3

Proposed Non-system Roads



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



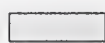
Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
2	Clearcut	20	Cable	13A
2	Overstory Removal	25	Helicopter	13B

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 0 Medium 17 High 21 Net Volume (MBF/Acre): 25 MBF

Unit Development & Stand Description

Species composition is 27% hemlock, 4% yellow-cedar, 69% western redcedar. In Alternative 2 the unit is 38 acres and will be cable yarded with 15% (6 acres) retained. In Alternatives 3 & 4 the unit is 38 acres and planned for helicopter yarding. Trees will be left for marten in all alternatives. Ensure adequate beach buffer and stream buffer along the east side of the unit. Portions of this unit are thought to have a wind disturbance history.

	Alt. 2	Alt. 3	Alt. 4
Treatment	Clearcut with Reserves	Overstory Removal	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	15% Ac	25% Tree/Ac	25% Trees/Ac
% Volume Removed	83%	91%	91%
Leave trees for Marten	Yes	Yes	Yes
Harvest Acres	32	38	38
Harvest Volume (MBF)	790	864	864
Cable Logging System Acres	32	None	None
Helicopter Logging System Acres	None	38	38
Yarded To	Road	Barge	Barge

Stand Management Objectives:

Alternative 2 - Future stand will be predominately even-aged with reserve clumps and scattered trees. Trees are being retained to meet visual quality objectives, marten guidelines, and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-30 to 110-180 trees per acre.

Alternatives 3 & 4 - Desired future condition for this is having two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives, meet marten guidelines, and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit adjacent to Class III stream (HC) tributary to marine waters. Windthrow.

Mitigation: No timber harvest within notch adjacent to Class III stream. Retain additional trees beyond buffer to provide some assurance of windfirmness within the buffer.

Soils

Concern: None

Mitigation:

Wildlife

Concern: Eagle nest on adjacent beach. High value marten habitat.

Mitigation: Follow MOU direction to avoid helicopter or ground disturbance within the nest buffer. Follow Forest Plan marten standards for retention of 7 trees/acre and forest structure.

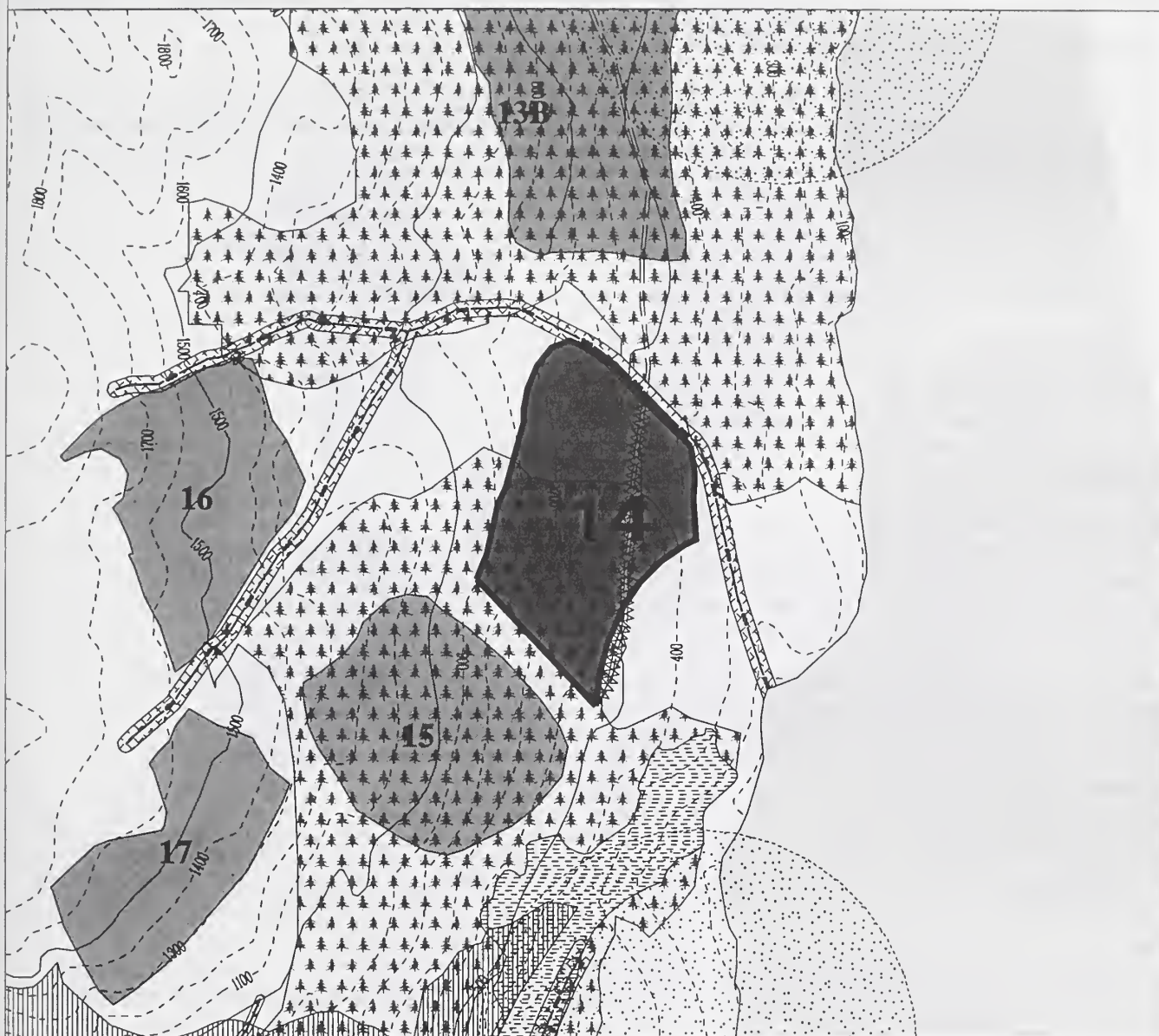
Visuals

Concern: Meet the Modification VQO. This unit is visible from the Seward and Santa Anna Viewpoints.

Mitigation: Alternative 2 - 15% reserve strategy will help to mitigate visual concerns. Place reserves near top of unit if possible. Alternatives 3 and 4- 25% retention with helicopter yarding will mitigate visual concerns.

Layout and Contract Concerns: Beach buffer, marten, visuals, eagle nest timing restrictions, and stream protection.

Mitigation Measures: F1, W1, W2, W6, W10, W16, V1, V2.



- | | | | | | |
|--|------------------------------|--|------------------|--|-----------------------------|
| | Class I Streams | | Eagle Nest Tree | | Proposed cut unit |
| | Class II Streams | | Riparian Buffers | | Adjacent proposed units |
| | Class III Streams | | TTRA Buffers | | Marten Guidelines Apply |
| | Class IV Streams | | | | Existing Harvest Units |
| | Proposed Roads -Alt 2 only | | | | High Hazard Soils |
| | Proposed Roads -Alts 2 and 3 | | | | Saltwater and Lakes |
| | Proposed Non-system Roads | | | | 1/4 Mile Eagle Nest Buffers |

Alternative	Prescription	Retention	Harvest System	Comments
2	Clearcut	15	Cable	
3 4	Overstory Removal	20	Helicopter	no roads

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 0 Medium 0 High 37 Net Volume (MBF/Acre): 27 MBF

Unit Development & Stand Description

Species composition is 32% hemlock, 2% Sitka spruce, 18% yellow-cedar, 48% western redcedar. Alternative 2 will harvest 15 acres in patches. Patch size will not exceed 5 acres. Alternative 4 will harvest 37 acres, retaining 25% of the trees. Both alternatives will need trees left for marten and will be yarded with a helicopter. Portions of this unit are thought to have a wind disturbance history

	Alt. 2	Alt. 4
Treatment	Patch Cut	Overstory Removal
% Retention of Ac, Trees.Ac or Vol	59% Ac	25% Trees/AC
& volume Removed	40%	90%
Leave trees for Marten	Yes	Yes
Harvest Volume (MBF)	397	899
Cable Logging System Acres	None	None
Helicopter Logging System Acres	15	37
Yarded To	Road	Barge

Stand Management Objectives:

Alternative 2 - Future stand will be multiple-aged. Overall stand will be uneven-aged, but the patches will be managed as even-aged. 59% of the stand is being retained to meet visual quality objectives and to provide structure. Natural regeneration is expected. Future stand treatments may include; planting of Sitka spruce or yellow-cedar, or pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Alternative 4 - Desired future condition for this is having two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives, meet marten guidelines, and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: None.

Mitigation:

Soils

Concern: Harvest on unmapped oversteepened slopes.

Mitigation: Alternative 2: Locate patches on slopes less than 72%. Alternative 4: Retention will maintain rooting strength.

Wildlife

Concern: Eagle nest on adjacent beach. High value marten habitat.

Mitigation: Follow MOU direction to avoid helicopter or ground disturbance within the nest buffer. Follow Forest Plan marten standards for retention of 7 trees/acre and forest structure.

Visuals

Concern: Meet Modification VQO. This unit is viewed straight on from the Santa Anna Viewpoint, and at an oblique angle from the Seward Viewpoint.

Mitigation: Alternative 2 - Design patch cut unit lines to blend with surrounding landscape. Alternative 4 - The size of the unit (under 40 acres) and 25% retention will help mitigate visual concerns.

Layout and Contract Concerns: Marten, visuals, eagle nest timing restrictions.

Mitigation Measures: F4, W2, W3, W6, W10, W16, V2, V3.

37 ACRES

ALTERNATIVE 2 4

UNIT 15



Class I Streams

Class II Streams

Class III Streams

Class IV Streams

Proposed Roads -Alt 2 only

Proposed Roads -Alts 2 and 3

Proposed Non-system Roads



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



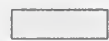
Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
2 4	Patch Cut	60	Helicopter	alt 4 no roads

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 2 Medium 28 High 2 Net Volume (MBF/Acre): 20 MBF

Unit Development & Stand Description

Species composition is 52% hemlock, 11% Sitka spruce, 28% yellow-cedar, 9% western redcedar. Unit is planned for helicopter yarding in all alternatives with 25% retention. Retention would be scattered throughout the unit.

	Alt. 2	Alt. 4
Treatment	Overstory Removal	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	25% Trees/Ac	25% Trees/Ac
% Volume Removed	92%	92%
Leave trees for Marten	No	No
Harvest Acres	32	32
Harvest Volume (MBF)	589	589
Cable Logging System Acres	None	None
Helicopter Logging System Acres	32	32
Yarded To	Road	Barge

Stand Management Objectives:

Desired future condition for this is having two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives, and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit adjacent to Class III streams (HC) tributary to marine waters.

Mitigation: No timber harvest within notch adjacent to Class III stream.

Soils

Concern: None

Mitigation:

Wildlife

Concern: Eagle nest south of unit.

Mitigation: Follow MOU direction to avoid helicopter or ground disturbance within the nest buffer.

Visuals

Concern: Meet Modification VQO. This unit is partially visible from the Seward and Santa Anna Viewpoints.

Mitigation: 25% retention will mitigate visual concerns.

Layout and Contract Concerns: Timing restrictions for eagle nest, visuals, and stream protection.

Mitigation Measures: F1, W2, W6, W10, V2.

32 ACRES

ALTERNATIVE 2 4

UNIT 16



Class I Streams

Class II Streams

Class III Streams

Class IV Streams

Proposed Roads -Alt 2 only

Proposed Roads -Alts 2 and 3

Proposed Non-system Roads



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
2 4	Overstory Removal	25	Helicopter	Alt 4 no roads

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 0 Medium 27 High 0 Net Volume (MBF/Acre): 21 MBF

Unit Development & Stand Description

Species composition is 61% hemlock, 11% Sitka spruce, 20% yellow-cedar, 8% western redcedar. Alternatives propose to retain 25% of trees, scattered throughout the unit. Unit would be helicopter yarded to the road in Alternative 2, and to a barge in Alternative 4.

	Alt. 2	Alt. 4
Treatment	Overstory Removal	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	25% Trees/Ac	25% Trees/Ac
% Volume Removed	92%	92%
Leave trees for Marten	No	No
Harvest Acres	27	27
Harvest Volume (MBF)	522	522
Cable Logging System Acres	None	None
Helicopter Logging System Acres	27	27
Yarded To	Road	Barge

Stand Management Objectives:

Desired future condition for this is having two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives, and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: None

Mitigation:

Soils

Concern: Harvest on steep and unstable slopes on west side of unit.

Mitigation: Locate unit boundary east of steep slopes.

Wildlife

Concern: Eagle nests to the southeast of the unit.

Mitigation: Follow MOU direction to avoid helicopter or ground disturbance within the nest buffer.

Visuals

Concern: Meet Modification VQO. This unit is visible from the Santa Anna Viewpoint.

Mitigation: 25% retention will mitigate visual concerns.

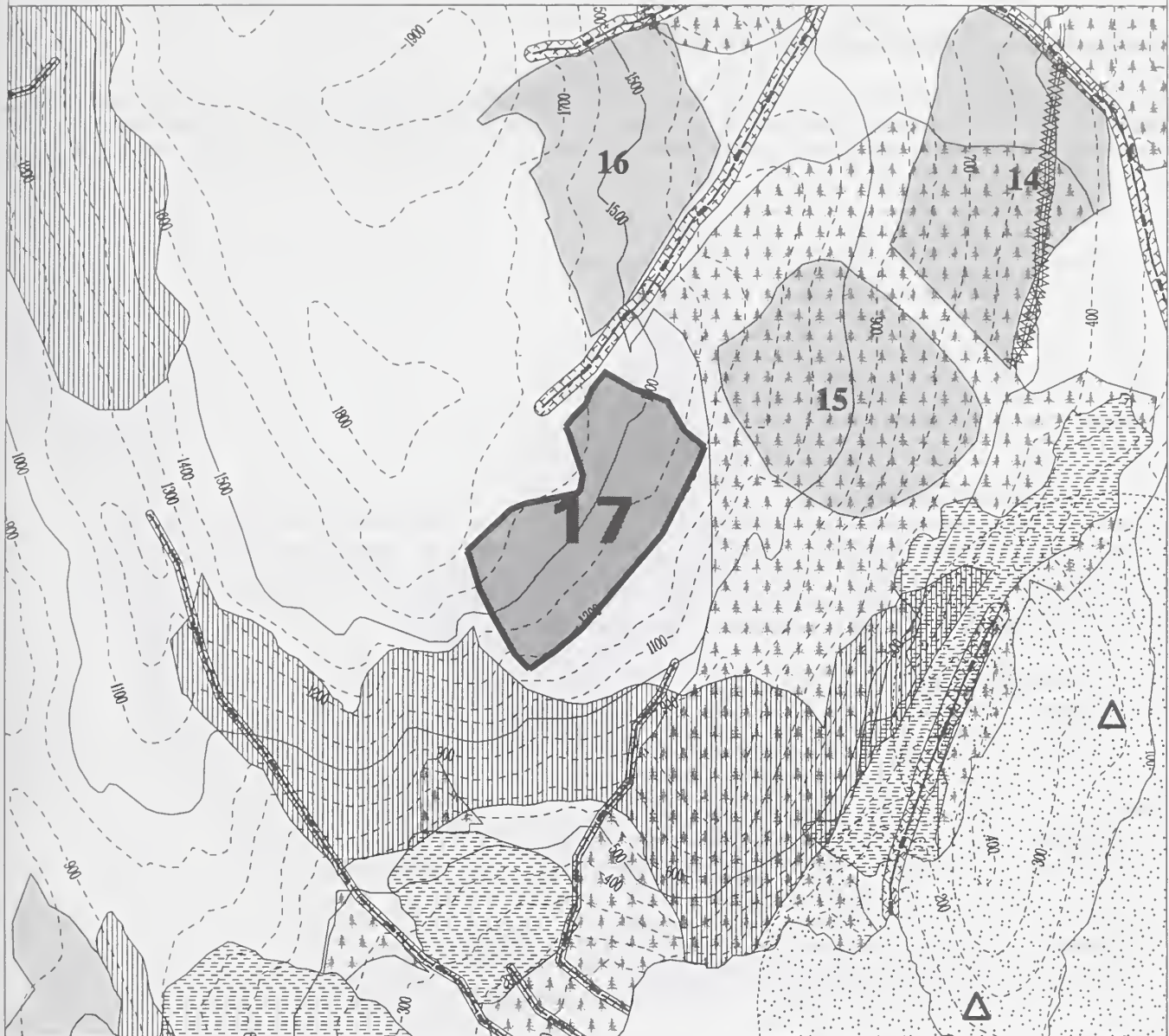
Layout and Contract Concerns: Eagle nests timing restrictions, visuals.

Mitigation Measures: F4, W2, W6, W10, V2.

27 ACRES

ALTERNATIVE 2 4

UNIT 17



Class I Streams

Class II Streams

Class III Streams

Class IV Streams

Proposed Roads - Alt 2 only

Proposed Roads - Alts 2 and 3

Proposed Non-system Roads



Eagle Nest Tree



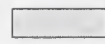
Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
2	Overstory Removal	25	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 0 Medium 46 High 20 Net Volume (MBF/Acre): 21 MBF

Unit Development & Stand Description

Species composition is 57% hemlock, 10% Sitka spruce, 27% yellow-cedar, 7% western redcedar. Alternative proposes to retain 10% of the trees, scattered throughout the unit. Logs would be helicopter yarded to a barge. The unit contains 20 acres of high value marten habitat and additional trees would need to be left for marten. This stand has a wind disturbance history.

Alt. 6

Treatment	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	10% Trees/Ac
% Volume Removed	96%
Leave trees for Marten	Yes
Harvest Volume (MBF)	1322
Cable Logging System Acres	None
Helicopter Logging System Acres	66
Yarded To	Barge

Stand Management Objectives:

Desired future condition for this is having two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives, meet marten guidelines, and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre. Some residual trees may eventually blow down, resulting in soil churning.

Water Quality & Fisheries

Concern: None

Mitigation:

Soils

Concern: Harvest on steep and unstable slopes on west side of unit.

Mitigation: Locate unit boundary east of steep slopes.

Wildlife

Concern: Eagle nests southeast of unit. High value marten habitat.

Mitigation: Follow MOU direction to avoid helicopter or ground disturbance within the nest buffer. Follow Forest Plan marten standards for retention of 7 trees/acre and forest structure.

Visuals

Concern: Meet Modification VQO. This unit is visible from the Santa Anna Viewpoint.

Mitigation: 10% retention will help mitigate the size of this unit. Where practical, increase retention to mitigate visual concerns.

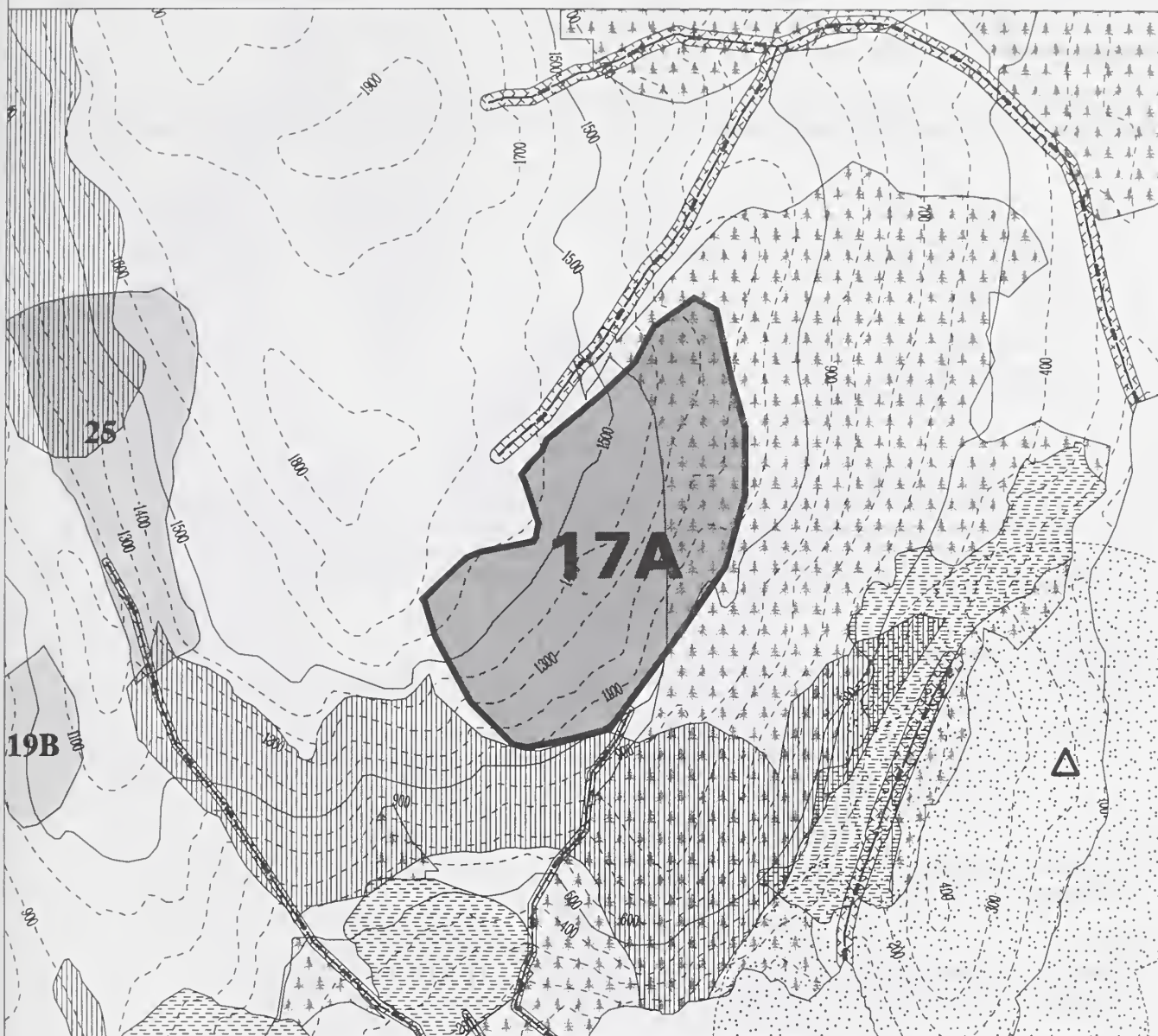
Layout and Contract Concerns: Marten, timing restrictions for eagle nests, visuals, steep slopes.

Mitigation Measures: F4, W2, W6, W10, W16, V2.

66 ACRES

ALTERNATIVE 6

UNIT 17A



Class I Streams

Class II Streams

Class III Streams

Class IV Streams



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



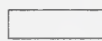
Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
6	Overstory Removal	10	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 3 Medium 48 High 1 Net Volume (MBF/Acre): 23 MBF

Unit Development & Stand Description

Species composition is 46% hemlock, 10% Sitka spruce, 34% yellow-cedar, 10% western redcedar. Alternatives propose to retain 25% of the trees, scattered throughout the unit. Unit would be helicopter yarded to a barge in all alternatives.

	Alt. 2	Alt. 3	Alt. 4 & 6
Treatment	Overstory Removal	Overstory Removal	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	25% Trees/Ac	25% Trees/Ac	25% Trees/Ac
% Volume Removed	92%	92%	92%
Leave trees for Marten	No	No	No
Harvest Acres	52	52	52
Harvest Volume (MBF)	1100	1100	1100
Cable Logging System Acres	None	None	None
Helicopter Logging System Acres	52	52	52
Yarded To	Barge	Barge	Barge

Stand Management Objectives:

Desired future condition for this is having two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives, and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit contains Class III and IV streams tributary to Bear Creek (Class I). Stream process group is HC. Blowdown.

Mitigation: No harvest within notch of Class III HC streams. Layout unit to leave additional trees beyond buffers to provide assurance of buffer windfirmness. Helicopter yarding provides adequate suspension across Class IV streams.

Soils

Concern: Steep slopes on north side of unit.

Mitigation: Unit boundary avoids steep slopes.

Wildlife

Concern: Potential wildlife travel corridor along Bear Creek.

Mitigation: Stream buffers will help mitigate concern.

Visuals

Concern: Meet the Modification VQO. This unit is visible from the South Ernest Viewpoint.

Mitigation: 25% retention will mitigate visual concerns.

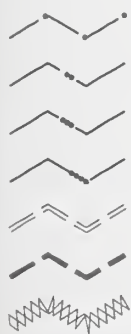
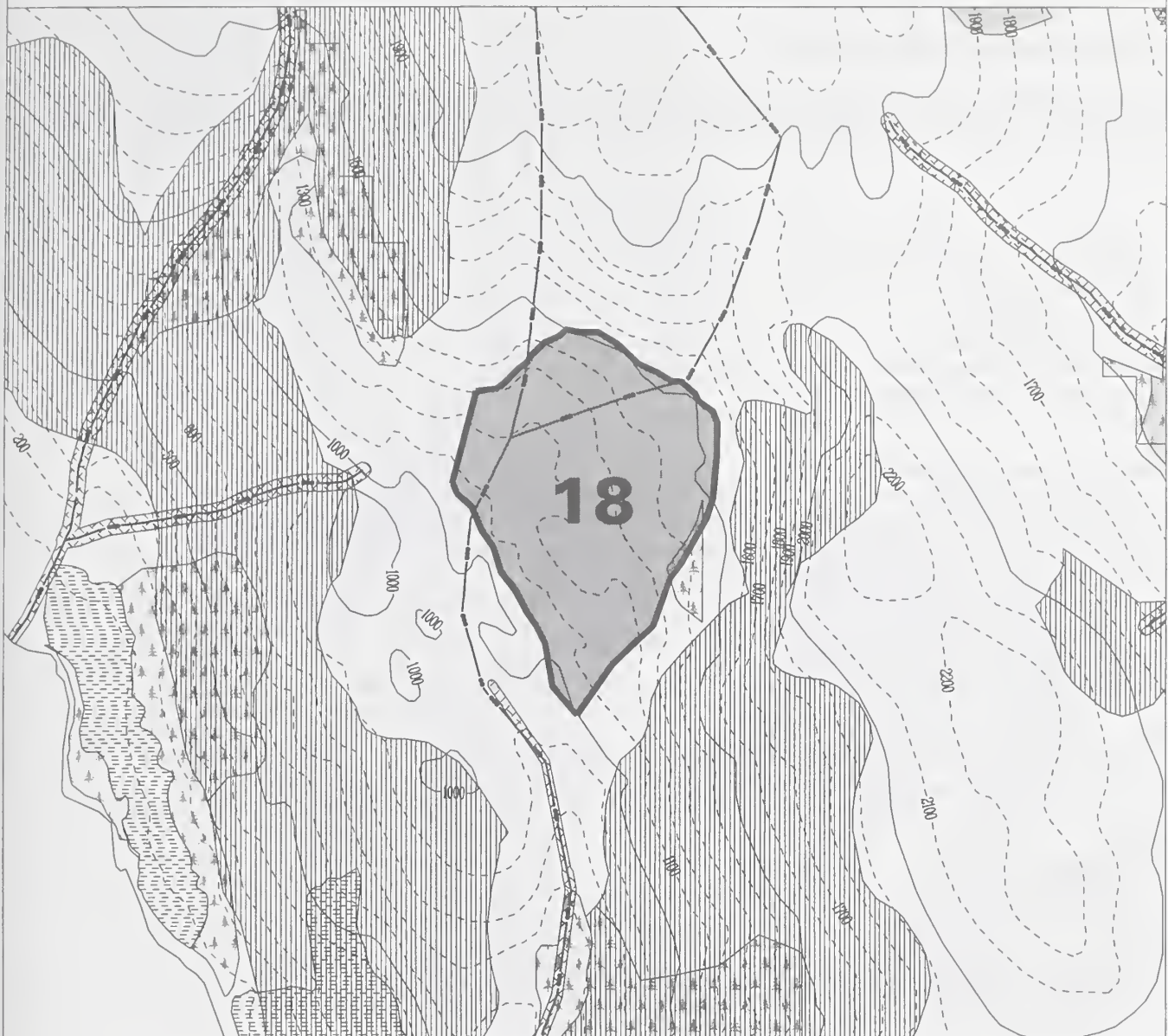
Layout and Contract Concerns: Visuals, stream protection.

Mitigation Measures: F1, F2, F5, W2, V2.

52 ACRES

ALTERNATIVE 2 3 4 6

UNIT 18



Class I Streams

Class II Streams

Class III Streams

Class IV Streams

Proposed Roads - Alt 2 only

Proposed Roads - Alts 2 and 3

Proposed Non-system Roads



Eagle Nest Tree



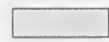
Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
2 3 4 6	Overstory Removal	25	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 0 Medium 14 High 1 Net Volume (MBF/Acre): 25MBF

Unit Development & Stand Description

Species composition is 46% hemlock, 10% Sitka spruce, 34% yellow-cedar, 10% western redcedar. Alternative proposes to clearcut unit. However, most trees smaller than 9 inches at DBH will be left standing. Unit would be helicopter yarded to a barge.

Alt. 6

Treatment	Clearcut
% Retention of Ac, Trees/Ac or Vol	None
% Volume Removed	100%
Leave trees for Marten	No
Harvest Volume (MBF)	375
Cable Logging System Acres	None
Helicopter Logging System Acres	15
Yarded To	Barge

Stand Management Objectives:

Stand will be predominately even-aged. Trees smaller than 9 inches at DBH will be left standing and this, in addition to unit shape and location, will help meet visual quality objectives. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: None.

Mitigation:

Soils

Concern: Harvest on steep and unstable slopes on west side of unit.

Mitigation: Locate unit on bench, avoiding steep slopes leading into notch of Deadhorse Creek.

Wildlife

Concern:

Mitigation:

Visuals

Concern: Meet the Modification VQO. This unit is visible from the South Ernest Viewpoint.

Mitigation: The small size of this unit and its position on a bench will mitigate visual concerns.

Layout and Contract Concerns: Visuals, steep slopes.

Mitigation Measures: F4, W3, V3.

15 ACRES

ALTERNATIVE 6

UNIT 18A



Class I Streams
Class II Streams
Class III Streams
Class IV Streams



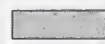
Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
6	Clearcut	0	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 3 Medium 16 High 1 Net Volume (MBF/Acre): 21 MBF

Unit Development & Stand Description

Species composition is 51% hemlock, 8% Sitka spruce, 21% yellow-cedar, 20% western redcedar. Alternative proposes to clearcut units. However, most trees smaller than 9 inches at DBH will be left standing. Units would be helicopter yarded to a barge.

Alt. 6

Treatment	Clearcut
% Retention of Ac, Trees/Ac or Vol	None
% Volume Removed	100%
Leave trees for Marten	No
Harvest Volume (MBF)	430
Cable Logging System Acres	None
Helicopter Logging System Acres	20
Yarded To	Barge

Stand Management Objectives:

Stand will be predominately even-aged. Trees less than 9 inches at dbh will be left standing and this will help meet visual quality objectives as will the unit shape and location. Retain trees smaller than 9 inches until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-30 to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit may contain small Class IV tributaries to Bear Creek.

Mitigation: Verify stream locations. Helicopter yarding will provide adequate stream protection.

Soils

Concern: Harvest on steep and unstable slopes.

Mitigation: Locate unit on bench, avoiding steep areas upslope and downslope.

Wildlife

Concern: Beach travel corridor has been compromised due to past logging. Eagle nest to west of unit.

Mitigation: Ensure prescription will retain forest structure. Unit is located to leave a forested buffer between it and beach managed stand. Eagle nest timing restrictions.

Visuals

Concern: Meet the Modification VQO. These units are visible from the South Ernest Viewpoint.

Mitigation: The small size of these units will help mitigate visual concerns.

Layout and Contract Concerns: Visuals, eagle nest timing restrictions.

Mitigation Measures: F2, F4, W3, W6, W10, V3.



- | | | | | | |
|--|-------------------|--|------------------|--|-----------------------------|
| | Class I Streams | | Eagle Nest Tree | | Proposed cut unit |
| | Class II Streams | | Riparian Buffers | | Adjacent proposed units |
| | Class III Streams | | TTRA Buffers | | Marten Guidelines Apply |
| | Class IV Streams | | | | Existing Harvest Units |
| | | | | | High Hazard Soils |
| | | | | | Saltwater and Lakes |
| | | | | | 1/4 Mile Eagle Nest Buffers |

Alternative	Prescription	Retention	Harvest System	Comments
6	Clearcut	0	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 2 Medium 53 High 0 Net Volume (MBF/Acre): 20 MBF

Unit Development & Stand Description

Species composition is 51% hemlock, 8% Sitka spruce, 21% yellow-cedar, 20% western redcedar. Alternatives retain 25% of trees, scattered throughout the unit. Logs would be helicopter yarded to a barge. This stand has wind disturbance history.

	Alt. 2	Alt. 4
Treatment	Overstory Removal	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	25% Trees/Ac	25% Trees/Ac
% Volume Removed	92%	92%
Leave trees for Marten	No	No
Harvest Acres	55	55
Harvest Volume (MBF)	1012	1012
Cable Logging System Acres	None	None
Helicopter Logging System Acres	55	55
Yarded To	Barge	Barge

Stand Management Objectives:

Desired future condition for this is having two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives, and to provide structure. Small diameter, windfirm trees will be retained until the next rotation. Natural regeneration is expected. Future stand treatments may include; planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: None.

Mitigation:

Soils

Concern: Harvest on steep slopes.

Mitigation: Locate unit boundaries to avoid slopes > 72% unless risks of mass movement assessed by Soil Scientist prior to layout.

Wildlife

Concern: Beach travel corridor has been compromised due to past logging. Eagle nests west of unit.

Mitigation: Ensure prescription will retain forest structure. Unit is designed to leave a forested buffer between it and beach managed stand. Timing restrictions for eagle nests.

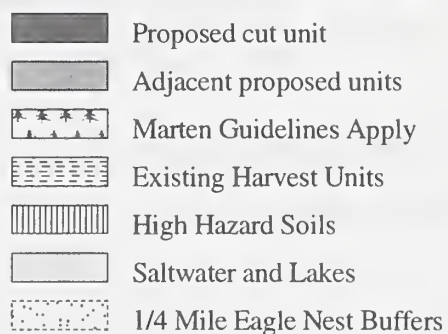
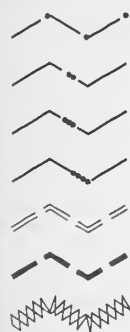
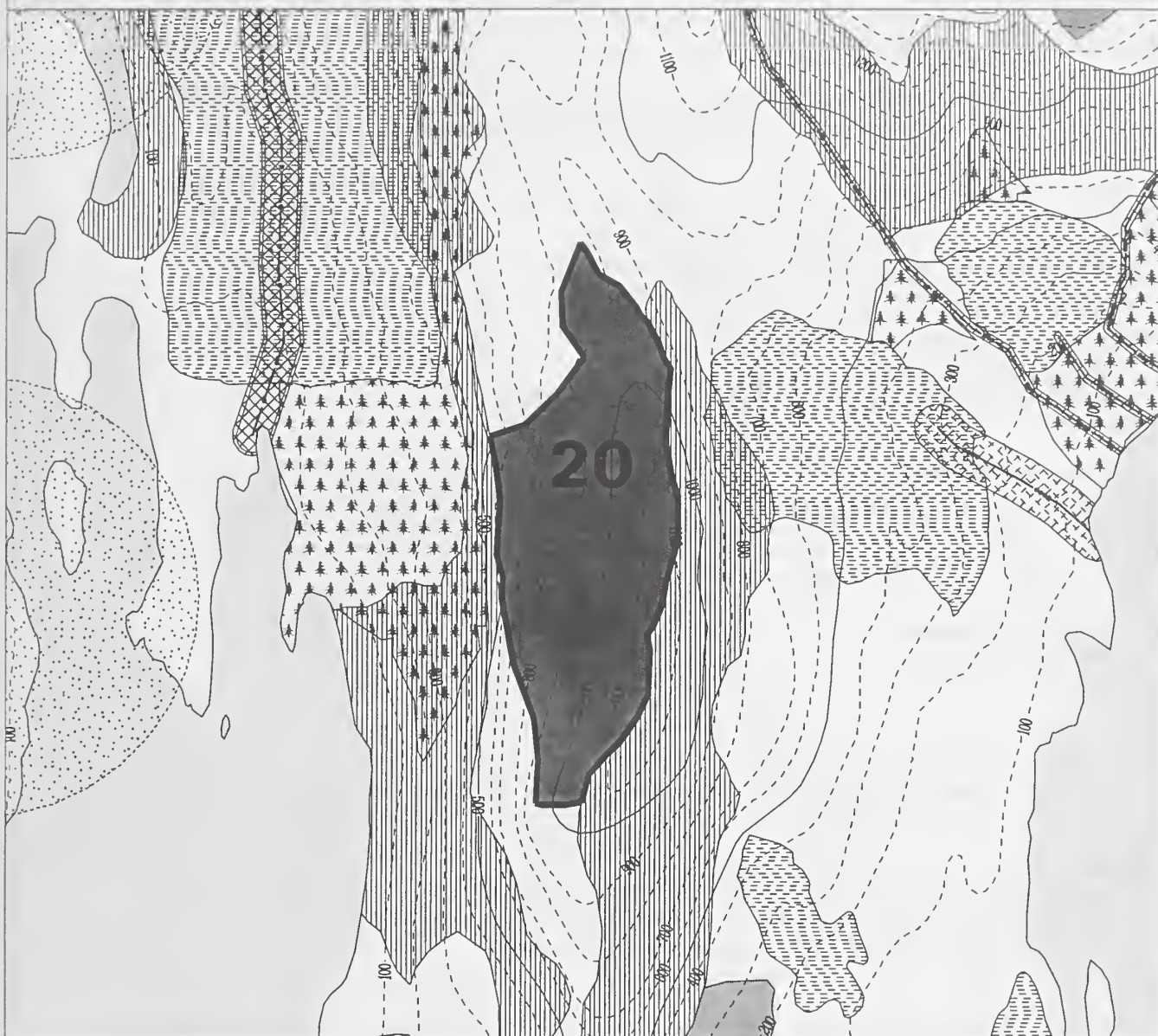
Visuals

Concern: Meet the Modification VQO. This unit is visible from the South Ernest Viewpoint, and partially visible from the Santa Anna Viewpoint.

Mitigation: 25% retention will help mitigate size of unit.

Layout and Contract Concerns: Visuals, eagle nest timing restrictions, steep slopes.

Mitigation Measures: F4, W2, W6, W10, V2.



Alternative	Prescription	Retention	Harvest System	Comments
2 4	Overstory Removal	25	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 0 Medium 30 High 0 Net Volume (MBF/Acre): 20 MBF

Unit Development & Stand Description

Species composition is 51% hemlock, 8% Sitka spruce, 21% yellow-cedar, 20% western redcedar. Alternative retains 10% of the trees, scattered throughout the unit. Logs would be helicopter yarded to a barge. This stand has wind disturbance history.

Alt. 6

Treatment	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	10% Trees/Ac
% Volume Removed	96%
Leave trees for Marten	No
Harvest Volume (MBF)	576
Cable Logging System Acres	None
Helicopter Logging System Acres	30
Yarded To	Barge

Stand Management Objectives:

Stand will be even-aged. Trees are being retained to meet visual quality objectives, meet marten guidelines, and to provide structure. Small diameter, windfirm trees will be retained until the next rotation. Natural regeneration is expected. Future stand treatments may include; planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: None.

Mitigation:

Soils

Concern: Harvest on steep slopes.

Mitigation: Locate unit boundaries to avoid steep slopes unless risks of mass movement assessed by Soil Scientist prior to layout.

Wildlife

Concern: Beach travel corridor has been compromised due to past logging. Eagle nest to west of unit.

Mitigation: Ensure prescription will retain forest structure. Unit is designed to leave a forested buffer between it and beach managed stand. Eagle nest timing restrictions.

Visuals

Concern: Meet the Modification VQO. This unit is visible from the South Ernest Viewpoint, and partially visible from the Santa Anna Viewpoint.

Mitigation: 10% retention will help mitigate visual concerns. Where practical locate retention strategically to address visual concern.

Layout and Contract Concerns: Visuals, eagle nest timing restrictions, steep slopes.

Mitigation Measures: F4, W2, W6, W10, V2.

30 ACRES

ALTERNATIVE 6

UNIT 20A



Class I Streams

Class II Streams

Class III Streams

Class IV Streams



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
6	Overstory Removal	10	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 0 Medium 14 High 0 Net Volume (MBF/Acre): 22 MBF

Unit Development & Stand Description

Species composition is 51% hemlock, 8% Sitka spruce, 21% yellow-cedar, 20% western redcedar. Alternatives retain 15% of the trees, scattered throughout the unit. Logs would be helicopter yarded to a barge in both alternatives.

	Alt. 2	Alt. 4
Treatment	Overstory Removal	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	15% Trees/Ac	15% Trees/Ac
% Volume Removed	92%	92%
Leave trees for Marten	No	No
Harvest Volume (MBF)	296	296
Cable Logging System Acres	None	None
Helicopter Logging System Acres	14	14
Yarded To	Barge	Barge

Stand Management Objectives:

Desired future condition for this is having two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives, and to provide structure. Retention will be left until until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit may contain Class IV streams tributary to marine waters.

Mitigation: Verify stream locations. Helicopter yarding provides adequate stream protection.

Soils

Concern: Harvest on oversteepened slopes.

Mitigation: Locate unit boundary to avoid steep slopes along the northwest edge of the unit.

Wildlife

Concern: Eagle nest southwest of unit.

Mitigation: Timing restrictions

Visuals

Concern: None.

Mitigation:

Layout and Contract Concerns: Class IV streams, eagle nest timing restriction.

Mitigation Measures: F2, W2, W6, W10.



Class I Streams

Class II Streams

Class III Streams

Class IV Streams

Proposed Roads -Alt 2 only

Proposed Roads -Alts 2 and 3

Proposed Non-system Roads



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
2 4	Overstory Removal	15	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 0 Medium 49 High 2 Net Volume (MBF/Acre): 22 MBF

Unit Development & Stand Description

Species composition is 51% hemlock, 8% Sitka spruce, 21% yellow-cedar, 20% western redcedar. Unit will harvest 50% of the stand in patches up to 10 acres in size. Unit has wind disturbance history. Locate patches to minimize blowdown of adjacent stand. Logs will be helicopter yarded to a barge.

Alt. 6

Treatment	Patch Cut
% Retention of Ac, Trees/Ac or Vol	50% Ac
% Volume Removed	48%
Leave trees for Marten	Yes
Harvest Volume (MBF)	539
Cable Logging System Acres	None
Helicopter Logging System Acres	25
Yarded To	Barge

Stand Management Objectives:

Future stand will be multiple-aged. Overall stand will be uneven-aged, but the patches will be managed as even-aged. 50% of the stand is being retained to meet visual quality objectives, and to provide structure. Natural regeneration is expected. Future stand treatments may include; planting of Sitka spruce or yellow-cedar, or pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit is adjacent Class III HC tributary to Deadhorse Creek (Class II). Buffer windthrow.

Mitigation: No harvest within notch of HC stream. Layout buffer to provide reasonable assurance of windfirmness.

Soils

Concern: Harvest on unstable oversteepened slopes.

Mitigation: Locate unit boundary to avoid slopes over 72%.

Wildlife

Concern:

Mitigation:

Visuals

Concern: Meet the Modification VQO. This unit is visible from the South Ernest Viewpoint.

Mitigation: Design patches to blend with the landscape. 50% retention will help mitigate visual concerns.

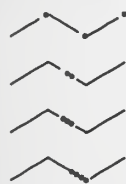
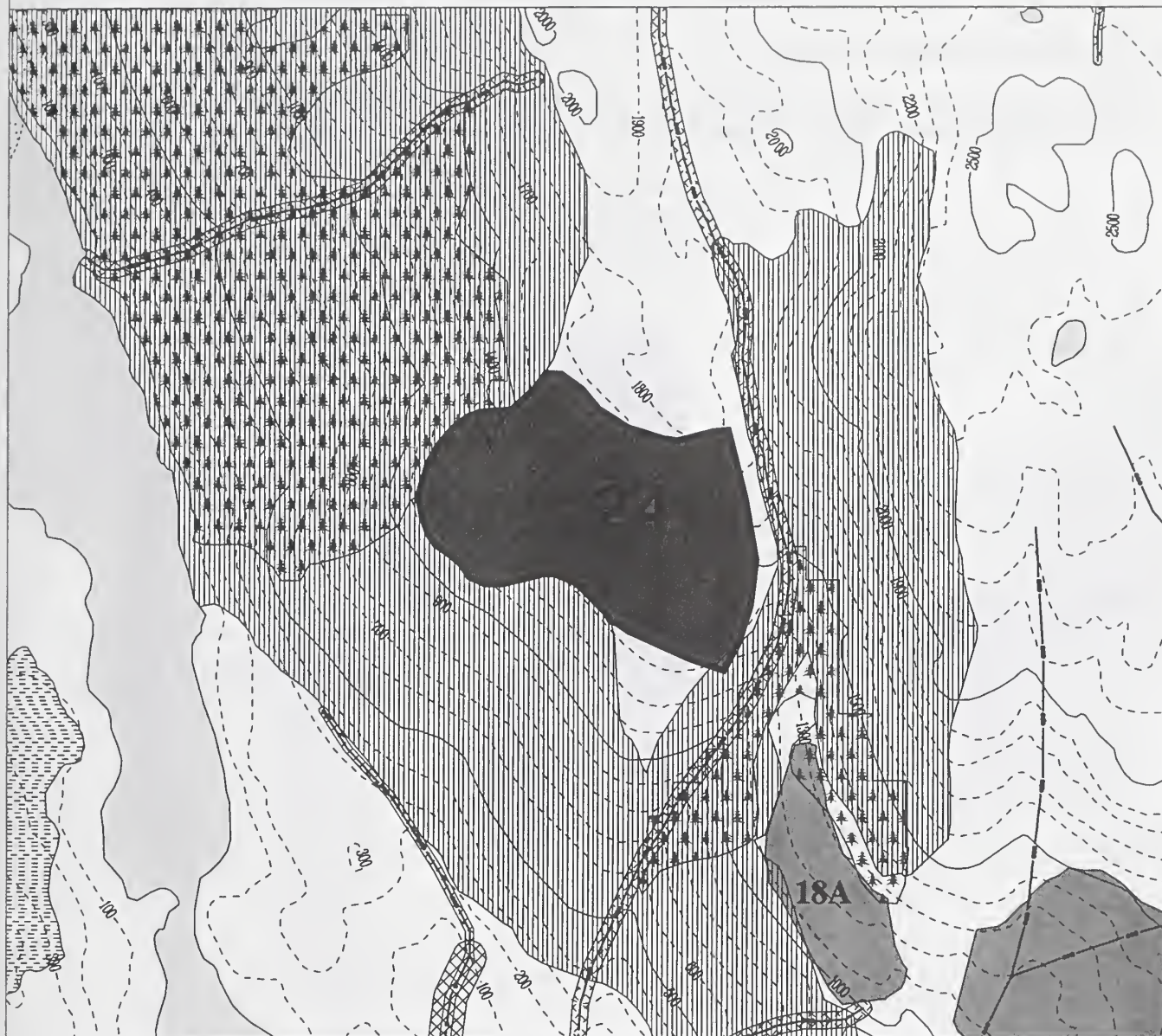
Layout and Contract Concerns: Visuals, streams and steep slopes.

Mitigation Measures: F1, F4, W3, V3.

51 ACRES

ALTERNATIVE 6

UNIT 24



Class I Streams

Class II Streams

Class III Streams

Class IV Streams



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



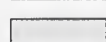
Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
6	Patch Cut	50	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 2 Medium 34 High 0 Net Volume (MBF/Acre): 22 MBF

Unit Development & Stand Description

Species composition is 65% hemlock, 15% Sitka spruce, 15% yellow-cedar, 5% western redcedar. Unit will retain 25% of the trees, scattered throughout the unit. Unit has wind disturbance history. Logs will be helicopter yarded to a barge.

Alt. 6

Treatment	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	25% Trees/Ac
% Volume Removed	92%
Leave trees for Marten	No
Harvest Volume (MBF)	729
Cable Logging System Acres	None
Helicopter Logging System Acres	36
Yarded To	Barge

Stand Management Objectives:

Desired future condition for this is having two canopy layers. Stand will be predominately two-aged. Trees are being retained to meet visual quality objectives and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit contains Class III and IV streams tributary to marine waters. Buffer windthrow.

Mitigation: No harvest within notch of Class III streams. Layout stream buffers to provide assurance of windfirmness. Helicopter provides adequate suspension over Class IV streams during yarding.

Soils

Concern: Steep slopes on northeast side of the unit.

Mitigation: Locate unit boundary to avoid harvest on slopes >72%.

Wildlife

Concern:

Mitigation:

Visuals

Concern: Meet the Modification VQO. This unit is visible from the South Ernest Viewpoint.

Mitigation: 25% retention will mitigate visual concerns.

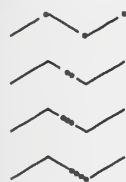
Layout and Contract Concerns: Stream protection, visuals, steep slopes.

Mitigation Measures: F1, F2, W2, V2.

36 ACRES

ALTERNATIVE 6

UNIT 25



Class I Streams

Class II Streams

Class III Streams

Class IV Streams



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
6	Overstory Removal	25	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 0 Medium 14 High 16 Net Volume (MBF/Acre): 27 MBF

Unit Development & Stand Description

Species composition is 51% hemlock, 8% Sitka spruce, 21% yellow-cedar, 20% western redcedar. Alternative retains 10% of the trees, scattered throughout the unit. Logs would be helicopter yarded to a barge. The east portion of the unit contains 5 acres of high value marten habitat.

Alt. 6

Treatment	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	10%
% Volume Removed	95%
Leave trees for Marten	Yes
Harvest Volume (MBF)	769
Cable Logging System Acres	None
Helicopter Logging System Acres	30
Yarded To	Barge

Stand Management Objectives:

Stand will be even-aged. Trees are being retained to meet visual quality objectives, meet marten guidelines, and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: None.

Mitigation:

Soils

Concern: None.

Mitigation:

Wildlife

Concern: Eagle nest east of unit. High value marten habitat within unit.

Mitigation: Timing restriction for eagle nest. Retain 7 trees per acre and forest structure in high value marten habitat.

Visuals

Concern: Meet Modification VQO. This unit is visible from the Seward and Santa Anna Viewpoints.

Mitigation: 10% retention will help mitigate visual concerns. Avoid sharp angles in unit boundaries during layout.

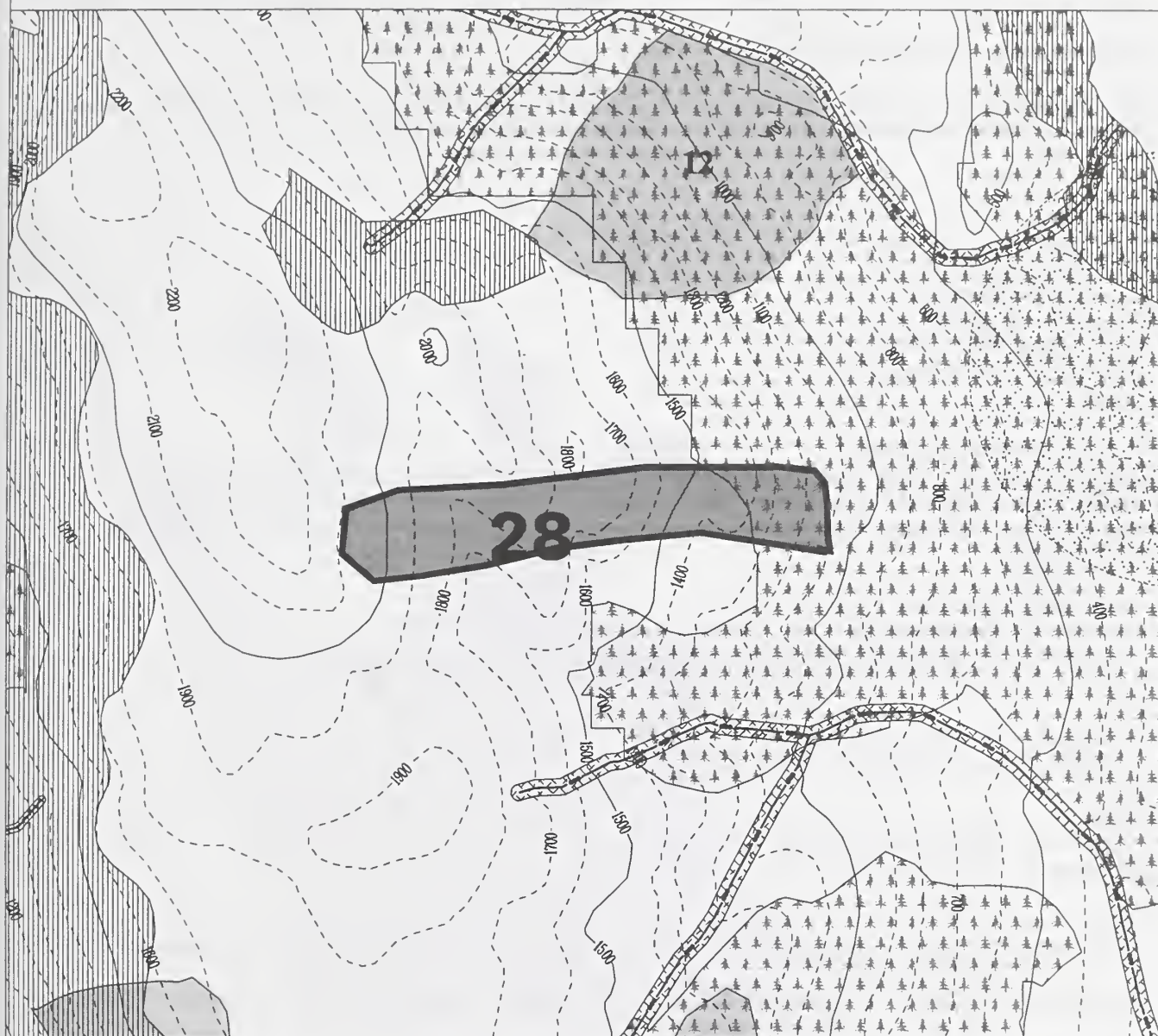
Layout and Contract Concerns: Marten, eagle nest timing restriction.

Mitigation Measures: W2, W6, W10, W16, V2.

30 ACRES

ALTERNATIVE

UNIT 28



Class I Streams

Class II Streams

Class III Streams

Class IV Streams



Eagle Nest Tree



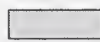
Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
6	Overstory Removal	10	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 27 Medium 8 High 0 Net Volume (MBF/Acre): 20 MBF

Unit Development & Stand Description

Species composition is 51% hemlock, 8% Sitka spruce, 21% yellow-cedar, 20% western redcedar. Alternative retains 10% of the trees, scattered throughout the unit. Logs would be helicopter yarded to a barge.

Alt. 6

Treatment	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	10% Trees/Ac
% Volume Removed	96%
Leave trees for Marten	No
Harvest Volume (MBF)	672
Cable Logging System Acres	None
Helicopter Logging System Acres	35
Yarded To	Barge

Stand Management Objectives:

Stand will be even-aged. Trees are being retained to meet visual quality objectives and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit may contain Class IV streams tributary to marine waters.

Mitigation: Verify streams. Helicopter yarding provides adequate stream protection.

Soils

Concern: Harvest on steep slopes.

Mitigation: Locate unit to avoid slopes over 72%.

Wildlife

Concern: Eagle nests west of unit.

Mitigation: Timing restrictions for eagle nests.

Visuals

Concern: Meet the Modification VQO. This unit is visible at an oblique angle from the South Ernest and North Ernest Viewpoints.

Mitigation: The size of the unit (under 40 acres) and 10% retention will help mitigate visual concerns.

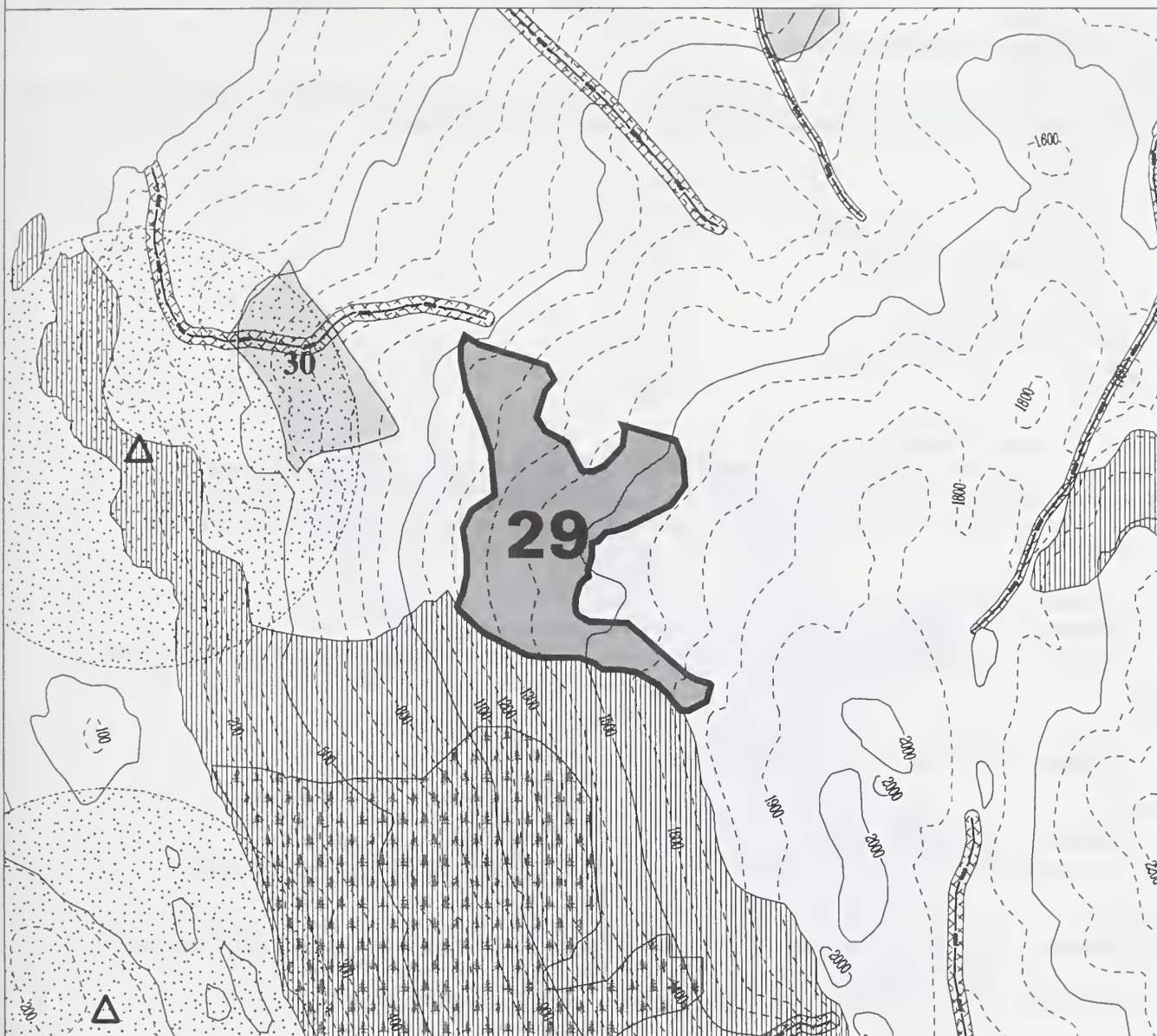
Layout and Contract Concerns: Eagle nest timing restrictions, steep slopes.

Mitigation Measures: F2, F4, W2, W6, W10, V2.

35 ACRES

ALTERNATIVE 6

UNIT 29



Class I Streams

Class II Streams

Class III Streams

Class IV Streams



Eagle Nest Tree



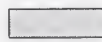
Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
6	Overstory Removal	10	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 0 Medium 14 High 0 Net Volume (MBF/Acre): 22 MBF

Unit Development & Stand Description

Species composition is 29% hemlock, 2% Sitka spruce, 6% yellow-cedar, 63% western redcedar. Alternative retains 10% of the trees, scattered throughout the unit. Logs would be helicopter yarded to a barge.

Alt. 6

Treatment	Overstory Removal
% Retention of Ac, Trees/Ac or Vol	10% Trees/Ac
% Volume Removed	96%
Leave trees for Marten	No
Harvest Volume (MBF)	296
Cable Logging System Acres	None
Helicopter Logging System Acres	14
Yarded To	Barge

Stand Management Objectives:

Stand will be even-aged. Trees are being retained to meet visual quality objectives and to provide structure. Retention will be left until next rotation. Natural regeneration is expected. Future stand treatments may include; release, planting of Sitka spruce or yellow-cedar, pre-commercial thinning at age 20-40 years to 110-180 trees per acre.

Water Quality & Fisheries

Concern: Unit contains Class III and IV tributaries to marine waters.

Mitigation: No harvest within notch of Class III streams. Helicopter yarding provides adequate stream protection.

Soils

Concern: Harvest on unmapped steep slopes.

Mitigation: Locate unit to avoid slopes over 72%.

Wildlife

Concern: Eagle nest west of unit.

Mitigation: Follow MOU direction to avoid helicopter or ground disturbance within the nest buffer.

Visuals

Concern: Meet the Modification VQO. This unit is visible at an oblique angle from the South Ernest and North Ernest Viewpoints.

Mitigation: The small size of the unit and 10% retention will help mitigate visual concerns.

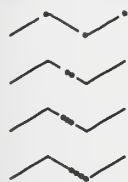
Layout and Contract Concerns: Stream protection, eagle nest timing restrictions.

Mitigation Measures: F1, F2, F4, W2, W6, W10, V2.

14 ACRES

ALTERNATIVE 6

UNIT 30



Class I Streams
Class II Streams
Class III Streams
Class IV Streams



Eagle Nest Tree



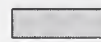
Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
6	Overstory Removal	10	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 40 Medium 185 High 0 Net Volume (MBF/Acre): 9 MBF

Unit Development & Stand Description

Species composition is 42% hemlock, 5% Sitka spruce, 20% yellow-cedar, 33% western redcedar. This alternative treats a large area and removes from 25 to 35% of the stand volume in this entry. The net volume per acre shown above at 9 MBF is the amount estimated to be removed. This is approximately 25-35% of the volume. About 65-75% of the volume will not be cut. No openings larger than 2 acres are expected and there will be some areas that will not have any trees cut. Trees to be harvested will be either marked, or designated by description, or a combination of methods will be used. Trees smaller than 9 inches at dbh will be cut only for safety reasons. It is estimated that very few trees smaller than 9 inches will be cut. The trees to be harvested will be the higher value trees. Trees with desirable structure for wildlife will be retained. A mix of tree species will be left. This unit contains areas of forested wetlands.

Alt. 5

Treatment	Individual & Group Selection
% Retention of Ac, Trees/Ac or Vol	65 to 75% Vol
% Volume Removed	25-35%
Leave trees for Marten	No
Harvest Volume (MBF)	2025
Cable Logging System Acres	None
Helicopter Logging System Acres	225
Yarded To	Barge

Stand Management Objectives:

Future stand will have several canopy layers. Overall stand will be uneven-aged. 65 to 75% of the stand is being retained to meet visual quality objectives, and to provide structure. Silvicultural prescriptions for wetland forests will maintain wetland functions. Western hemlock and western redcedar regeneration is expected. Possible future treatments may include a release cutting.

Water Quality & Fisheries

Concern: Unit contains Class III and IV tributaries to Froth and Foam Creeks (Class II) and an un-named Class III stream flowing directly to marine waters. Stream process group is HC.

Mitigation: No harvest within notch adjacent to HC streams. Verify presence of Class IV streams. Unit designed for helicopter yarding which will ensure that streams receive adequate suspension during yarding.

Soils

Concern: Occurrence of TLMP organic soils.

Mitigation: Field verify SMU 91B, if organic soils are found to occupy areas larger than 2 acres in size, exclude from the unit.

Wildlife

Concern: Eagle nest on adjacent beach.

Mitigation: Follow MOU direction to avoid helicopter or ground disturbance within the nest buffer.

Visuals

Concern: Meet the Modification VQO. This unit is visible from the North Ernest Viewpoint.

Mitigation: The irregular-shaped boundary and 65-75% retention will mitigate visual concerns.

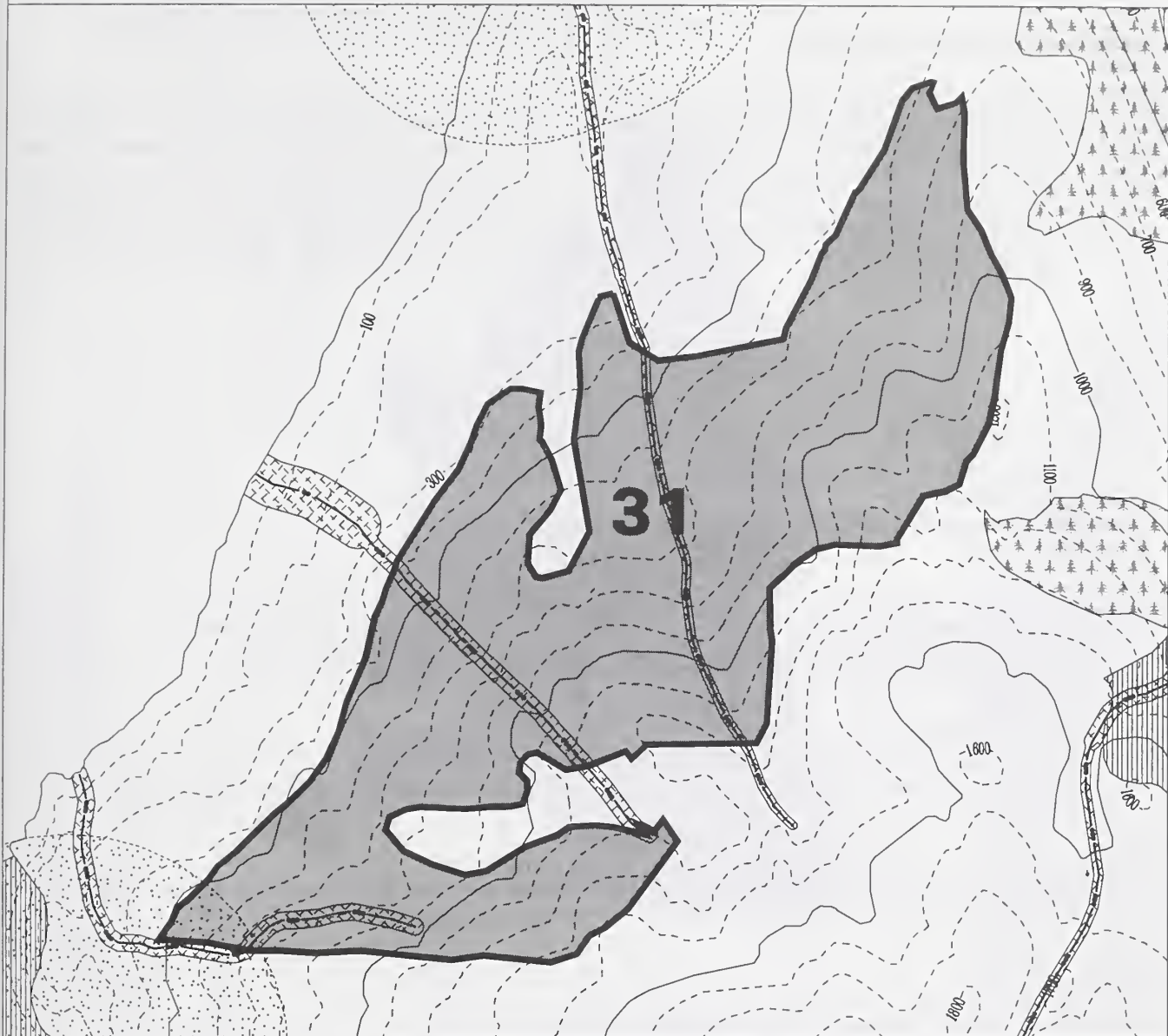
Layout and Contract Concerns: Timing restrictions, wetlands, stream protection.

Mitigation Measures: F1, F2, F3, W4, W6, W10, V4.

225 ACRES

ALTERNATIVE 5

UNIT 31



Class I Streams
Class II Streams
Class III Streams
Class IV Streams



Eagle Nest Tree



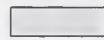
Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



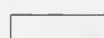
Marten Guidelines Apply



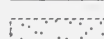
Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
5	ITM-Group Select	65-75	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 14 Medium 89 High 93 Net Volume (MBF/Acre): 9 MBF

Unit Development & Stand Description

Species composition is 76% hemlock, 18% Sitka spruce, 6% yellow-cedar, 0% western redcedar. This alternative treats a large area and removes from 25 to 35% of the stand volume in this entry. The net volume per acre shown above at 9 MBF is the amount estimated to be removed. This is approximately 25-35% of the volume. About 65-75% of the volume will be not be cut. No openings larger than 2 acres are expected and there will be some areas that will not have any trees cut. Trees to be harvested will be either marked or designated by description or a combination of methods will be used. Trees smaller than 9 inches at dbh will be cut only for safety reasons. It is estimated that very few trees below 9 inches will be cut. The trees to be removed will be the higher value trees and trees with desirable structure for wildlife will be retained. A mix of tree species will be left.

Alt. 5

Treatment	Individual & Group Selection
% Retention of Ac, Trees/Ac or Vol	65 to 75% Vol
% Volume Removed	25-35%
Leave trees for Marten	No
Harvest Volume (MBF)	1764
Cable Logging System Acres	None
Helicopter Logging System Acres	196
Yarded To	Barge

Stand Management Objectives:

Future stand will have several canopy layers. Overall stand will be uneven-aged. 65 to 75% of the stand is being retained to meet visual quality objectives, and to provide structure. Mostly western hemlock regeneration is expected. Possible future treatments may include a release cutting.

Water Quality & Fisheries

Concern: Unit may contain Class IV tributaries to marine water.

Mitigation: Verify Class IV streams. Helicopter yarding will ensure adequate suspension over streams.

Soils

Concern: Occurrence of TLMP organic soils on the west side of the unit.

Mitigation: Field verify soil type, if organic soils are found to occupy areas larger than 2 acres in size, exclude from the unit.

Wildlife

Concern: Unit contains high value marten habitat.

Mitigation: Harvest prescription provides sufficient leave trees.

Visuals

Concern: Meet the Modification VQO. This unit is visible from the Frosty and Seward Viewpoints, and at an oblique angle from the Santa Anna Viewpoint.

Mitigation: The irregular-shaped boundary and 65-75% retention will mitigate visual concerns.

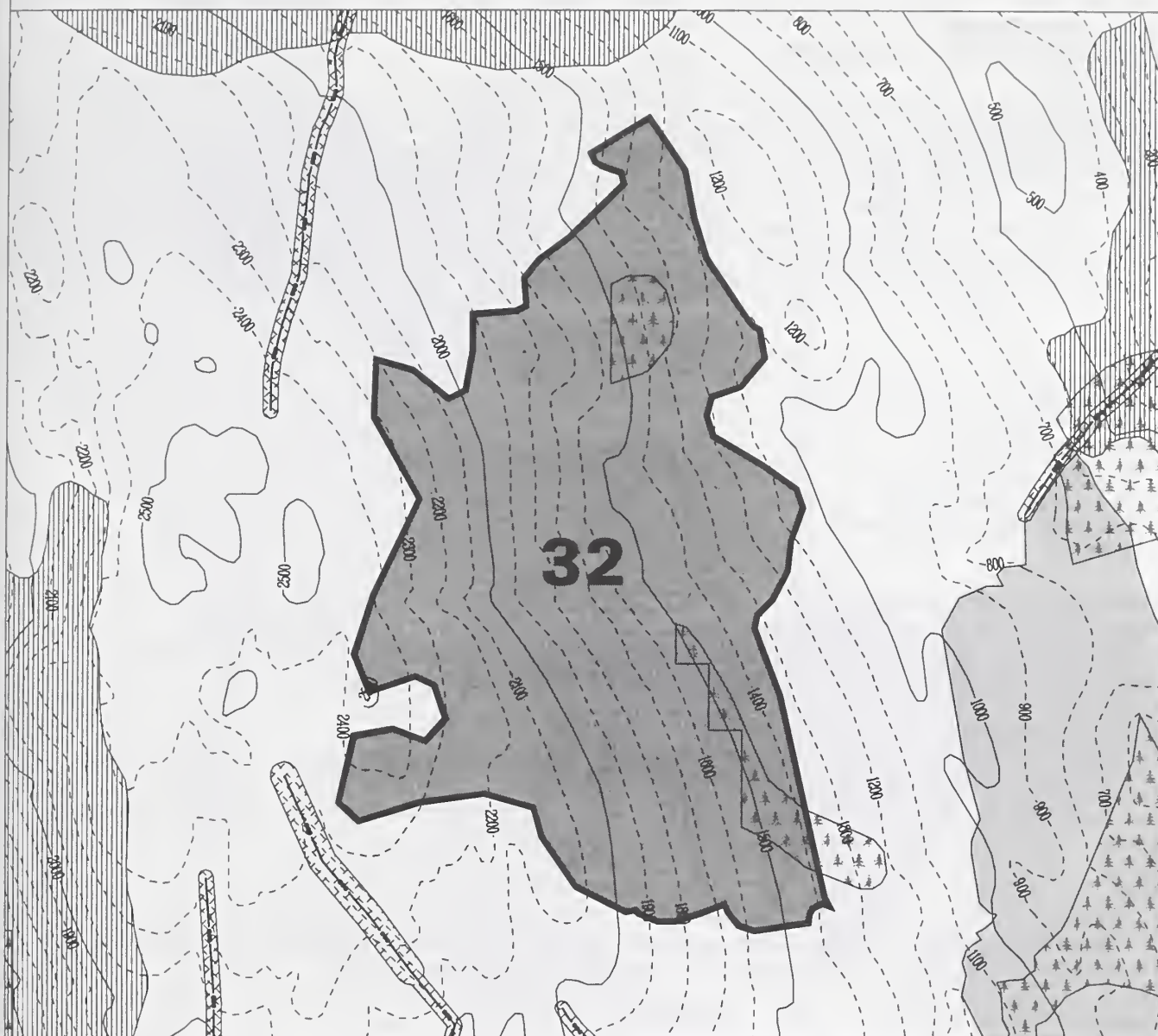
Layout and Contract Concerns: stream protection.

Mitigation Measures: F2, W4, W16, V4.

196 ACRES

ALTERNATIVE 5

UNIT 32



Class I Streams
Class II Streams
Class III Streams
Class IV Streams



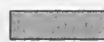
Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
5	ITM-Group Select	65-75	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: February 10, 2000

Volstrata Acres: Low 4 Medium 148 High 17 Net Volume (MBF/Acre): 9 MBF

Unit Development & Stand Description

Species composition is 46% hemlock, 10% Sitka spruce, 34% yellow-cedar, 10% western redcedar. This alternative treats a large area and removes from 25 to 35% of the stand volume in this entry. The net volume per acre shown above at 9 MBF is the amount estimated to be removed. This is approximately 25-35% of the volume. About 65-75% of the volume will not be cut. No openings larger than 2 acres are expected and there will be some areas that will not have any trees cut, therefore, we don't expect windthrow to be a concern. Trees to be harvested will be either marked or designated by description or a combination of methods will be used. Trees smaller than 9 inches at dbh will be cut only for safety reasons. It is estimated that very few trees below 9 inches will be cut. The trees to be removed will be the higher value trees and trees with desirable structure for wildlife will be retained. A mix of tree species will be left.

Alt. 5

Treatment	Individual & Group Selection
% Retention of Ac, Trees/Ac or Vol	65 to 75% Vol
% Volume Removed	25-35%
Leave trees for Marten	No
Harvest Volume (MBF)	1521
Cable Logging System Acres	None
Helicopter Logging System Acres	169
Yarded To	Barge

Stand Management Objectives:

Future stand will have several canopy layers. Overall stand will be uneven-aged. 65 to 75% of the stand is being retained to meet visual quality objectives, and to provide structure. Mostly western hemlock and redcedar regeneration is expected. Possible future treatments may include a release cutting.

Water Quality & Fisheries

- Concern:** Unit contains Class III and IV tributaries to Deadhorse (Class II) and Bear (Class I) Creeks. Stream process group is HC.
- Mitigation:** No harvest within notch of Class III HC streams. Helicopter yarding provides adequate suspension over Class IV streams.

Soils

- Concern:** Unit contains areas of high hazard soils.
- Mitigation:** Unit layout will avoid slopes greater than 72% adjacent to the v-notch buffer on Deadhorse creek. Retention of > 60% of the trees is expected to maintain rooting strength.

Wildlife

- Concern:** Unit contains high value marten habitat.
- Mitigation:** Harvest prescription provides sufficient leave trees.

Visuals

- Concern:** Meet the Modification VQO. This unit is visible from the South Ernest Viewpoint.
- Mitigation:** The irregular-shaped boundary and 65-75% retention will mitigate visual concerns.

Layout and Contract Concerns: stream protection, steep slopes.

Mitigation Measures: F1, F2, F4, W4, W16, V4.

169 ACRES

ALTERNATIVE 5

UNIT 33



Class I Streams

Class II Streams

Class III Streams

Class IV Streams



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



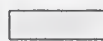
Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
5	ITM-Group Select	65-75	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: February 10, 2000

Volstrata Acres: Low 71 Medium 86 High 103 Net Volume (MBF/Acre): 9 MBF

Unit Development & Stand Description

Species composition is 56% hemlock, 8% Sitka spruce, 25% yellow-cedar, 11% western redcedar. This alternative treats a large area and removes from 25 to 35% of the stand volume in this entry. The net volume per acre shown above at 9 MBF is the amount estimated to be removed. This is approximately 25-35% of the volume. About 65-75% of the volume will not be cut. No openings larger than 2 acres are expected and there will be some areas that will not have any trees cut, therefore we do not expect windthrow to be a concern. Trees to be harvested will be either marked or designated by description or a combination of methods will be used. Trees smaller than 9 inches at dbh will be cut only for safety reasons. It is estimated that very few trees below 9 inches will be cut. The trees to be removed will be the higher value trees and trees with desirable structure for wildlife will be retained. A mix of tree species will be left.

Alt. 5

Treatment	Individual & Group Selection
% Retention of Ac, Trees/Ac or Vol	65 to 75% Vol
% Volume Removed	25-35%
Harvest Volume (MBF)	2340
Cable Logging System Acres	None
Helicopter Logging System Acres	260
Yarded To	Barge

Stand Management Objectives:

Future stand will have several canopy layers. Overall stand will be uneven-aged. 65 to 75% of the stand is being retained to meet visual quality objectives, and to provide structure. Mostly western hemlock regeneration is expected. Possible future treatments may include a release cutting.

Water Quality & Fisheries

- Concern:** Unit contains Class III and IV streams tributary to marine waters. Stream process group is HC.
- Mitigation:** No harvest within notch of Class III HC streams. Helicopter will provide adequate suspension over Class IV streams.

Soils

- Concern:** High hazard soils adjacent to southwest unit boundary. Occurrence of TLMP organic soils.
- Mitigation:** Avoid harvest on slopes exceeding 72% when they are adjacent to stream buffers. Field verify SMU 91B and 32B, if organic soils are found to occupy areas larger than 2 acres in size they will be excluded from the unit.

Wildlife

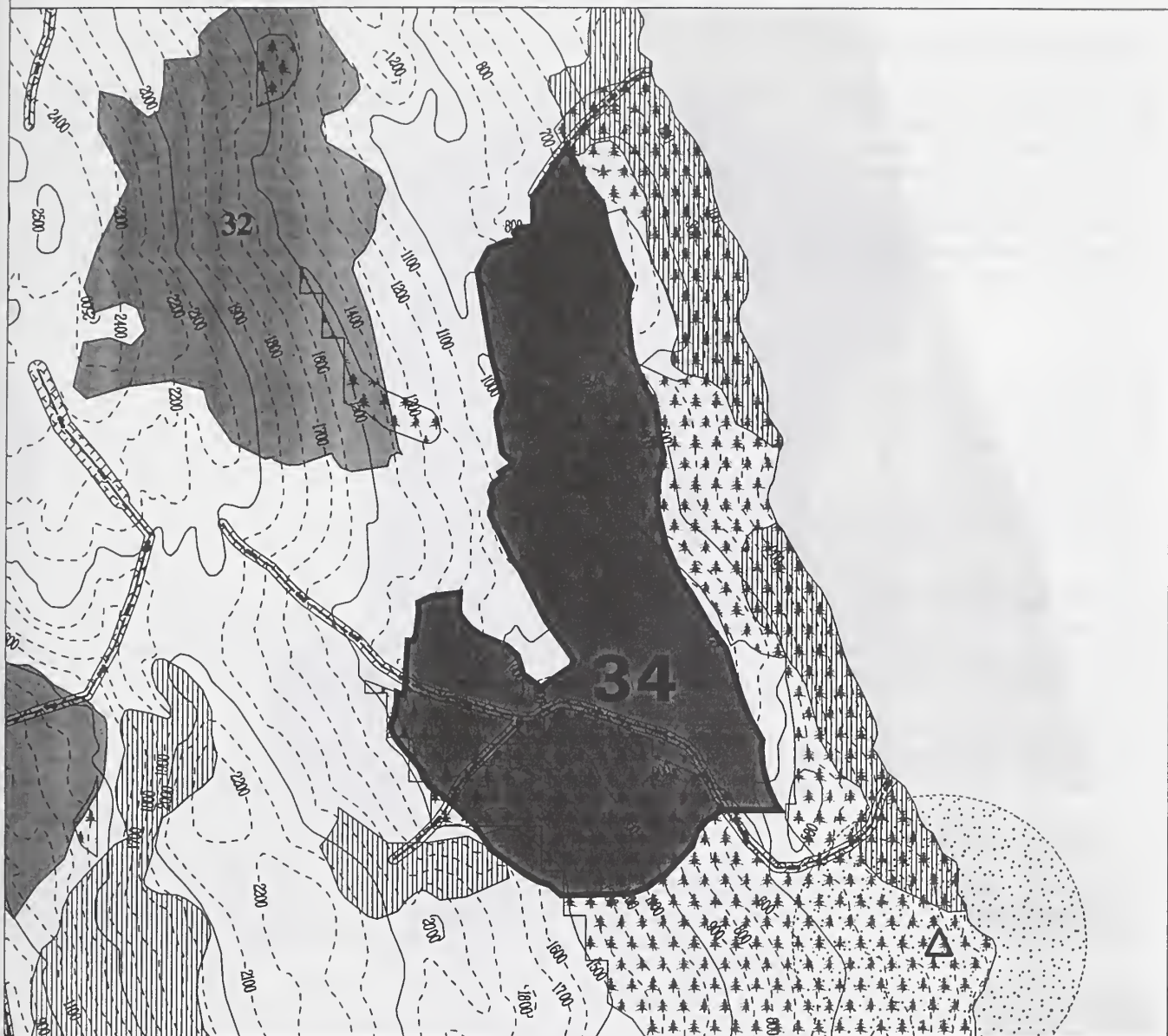
- Concern:** Unit contains high value marten habitat. Eagle nest on adjacent beach.
- Mitigation:** Harvest prescription provides sufficient leave trees. Follow MOU direction to avoid helicopter or ground disturbance within the nest buffer.

Visuals

- Concern:** Meet the Modification VQO. This unit is partially visible from the Frosty and Seward Viewpoints, and at an oblique angle from the Santa Anna Viewpoint.
- Mitigation:** The irregular-shaped boundary and 65-75% retention will mitigate visual concerns.

Layout and Contract Concerns: Timing restrictions, stream protection.

Mitigation Measures: F1, F2, F4, W4, W6, W10, W16, V4.



- | | | | | | |
|--|-------------------|--|------------------|--|-----------------------------|
| | Class I Streams | | Eagle Nest Tree | | Proposed cut unit |
| | Class II Streams | | Riparian Buffers | | Adjacent proposed units |
| | Class III Streams | | TTRA Buffers | | Marten Guidelines Apply |
| | Class IV Streams | | | | Existing Harvest Units |
| | | | | | High Hazard Soils |
| | | | | | Saltwater and Lakes |
| | | | | | 1/4 Mile Eagle Nest Buffers |

Alternative	Prescription	Retention	Harvest System	Comments
5	ITM-Group Select	65-75	Helicopter	

Scale: 1 inch = 1500 feet
 *NOTE SMALLER SCALE

Last Updated: February 10, 2000

Volstrata Acres: Low 3 Medium 132 High 149 Net Volume (MBF/Acre): 9 MBF

Unit Development & Stand Description

Species composition is 49% hemlock, 7% Sitka spruce, 16% yellow-cedar, 28% western redcedar. This alternative treats a large area and removes from 25 to 35% of the stand volume in this entry. The net volume per acre shown above at 9 MBF is the amount estimated to be removed. This is approximately 25-35% of the volume. About 65-75% of the volume will be not be cut. No openings larger than 2 acres are expected and there will be some areas that will not have any trees cut, therefore we do not expect windthrow to be a concern. Trees to be harvested will be either marked or designated by description or a combination of methods will be used. Trees smaller than 9 inches at dbh will be cut only for safety reasons. It is estimated that very few trees below 9 inches will be cut. The trees to be removed will be the higher value trees and trees with desirable structure for wildlife will be retained. A mix of tree species will be left.

Alt. 5

Treatment	Individual & Group Selection
% Retention of Ac, Trees/Ac or Vol	65 to 75% Vol
% Volume Removed	25-35%
Leave trees for Marten	No
Harvest Volume (MBF)	2556
Cable Logging System Acres	None
Helicopter Logging System Acres	284
Yarded To	Barge

Stand Management Objectives:

Future stand will have several canopy layers. Overall stand will be uneven-aged. 65 to 75% of the stand is being retained to meet visual quality objectives, and to provide structure. Mostly western hemlock and redcedar regeneration is expected. Possible future treatments may include a release cutting.

Water Quality & Fisheries

- Concern:** Unit contains Class III and IV streams tributary to marine waters. Stream process group is HC.
- Mitigation:** No harvest within notch of Class III HC streams. Helicopter will provide adequate suspension over Class IV streams.

Soils

- Concern:** High hazard soils in south and southwest part of the unit.
- Mitigation:** Avoid harvest on slopes exceeding 72% when they are adjacent to stream buffers. Unit boundary will be layed out to avoid extremely steep slopes, landslide prone slopes. Retention of >60% of the trees is expected to main rooting strength.

Wildlife

- Concern:** Unit contains high value marten habitat. Eagle nest location on adjacent beach. Beach travel corridor has been compromised due to past logging.
- Mitigation:** Harvest prescription provides sufficient leave trees for marten. Follow MOU direction to avoid helicopter or ground disturbance within the nest buffer. Prescription will retain forest structure.

Visuals

- Concern:** Meet the Modification VQO. This unit is visible from the Santa Anna Viewpoint, and partially visible from the Seward Viewpoint.
- Mitigation:** The irregular-shaped boundary and 65-75% retention will mitigate visual concerns.

Layout and Contract Concerns: Timing restrictions, steep slopes.

Mitigation Measures: F1, F2, F4, W4, W6, W10, W16, V4.

284 ACRES

ALTERNATIVE 5

UNIT 35



Class I Streams
Class II Streams
Class III Streams
Class IV Streams



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



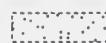
Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
5	ITM-Group Select	65-75	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 21 Medium 107 High 5 Net Volume (MBF/Acre): 9 MBF

Unit Development & Stand Description

Species composition is 56% hemlock, 19% Sitka spruce, 22% yellow-cedar, 3% western redcedar. This alternative treats a large area and removes from 25 to 35% of the stand volume in this entry. The net volume per acre shown above at 9 MBF is the amount estimated to be removed. This is approximately 25-35% of the volume. About 65-75% of the volume will be not be cut. No openings larger than 2 acres are expected and there will be some areas that will not have any trees cut, therefore we do not expect windthrow to be a concern. Trees to be harvested will be either marked or designated by description or a combination of methods will be used. Trees smaller than 9 inches at dbh will be cut only for safety reasons. It is estimated that very few trees below 9 inches will be cut. The trees to be removed will be the higher value trees and trees with desirable structure for wildlife will be retained. A mix of tree species will be left.

Alt. 5

Treatment	Individual & Group Selection
% Retention of Ac, Trees/Ac or Vol	65 to 75% Vol
% Volume Removed	25-35%
Leave trees for Marten	No
Harvest Volume (MBF)	1197
Cable Logging System Acres	None
Helicopter Logging System Acres	133
Yarded To	Barge

Stand Management Objectives:

Future stand will have several canopy layers. Overall stand will be uneven-aged. 65 to 75% of the stand is being retained to meet visual quality objectives, and to provide structure. Mostly western hemlock and redcedar regeneration is expected. Possible future treatments may include a release cutting.

Water Quality & Fisheries

- Concern:** Unit contains Class III and IV streams tributary to marine waters and may contain Class IV streams tributary to Bear Creek. Stream process group is HC.
- Mitigation:** No harvest within notch of Class III HC streams. Helicopter will provide adequate suspension over Class IV streams.

Soils

- Concern:** High hazard soils adjacent to Class IV stream on north and east side of unit. Occurrence of TLMP organic soils.
- Mitigation:** Avoid harvest on slopes exceeding 72% when they are adjacent to stream buffers. Retention of >60% of the trees is expected to maintain rooting strength. Field verify SMU 91B, if organic soils are found to occupy areas larger than 2 acres in size they will be excluded from the unit

Wildlife

- Concern:** Unit contains high value marten habitat. Eagle nest location on adjacent beach. Beach travel corridor has been compromised due to past logging.
- Mitigation:** Harvest prescription provides sufficient leave trees for marten. Follow MOU direction to avoid helicopter or ground disturbance within the nest buffer. 'rescription will retain forest structure. Unit is located to leave a forested buffer between it and beach managed stand.

Visuals

- Concern:** Meet the Modification VQO. Unit is visible from the South Ernest Viewpoint, and may be partially visible from the Santa Anna Viewpoint.
- Mitigation:** The irregular-shaped boundary and 65-75% retention will mitigate visual concerns.

Layout and Contract Concerns: Timing restrictions.

Mitigation Measures: F1, F2, F4, W4, W6, W10, W16, V4.

133 ACRES

ALTERNATIVE 5

UNIT 36



Class I Streams

Class II Streams

Class III Streams

Class IV Streams



Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
5	ITM-Group Select	65-75	Helicopter	

Scale: 1 inch = 1000 feet

Last Updated: December 21, 1999

Volstrata Acres: Low 12 Medium 65 High 1 Net Volume (MBF/Acre): 9 MBF

Unit Development & Stand Description

Species composition is 51% hemlock, 8% Sitka spruce, 21% yellow-cedar, 20% western redcedar. This alternative treats a large area and removes from 25 to 35% of the stand volume in this entry. The net volume per acre shown above at 9 MBF is the amount estimated to be removed. This is approximately 25-35% of the volume. About 65-75% of the volume will be not be cut. No openings larger than 2 acres are expected and there will be some areas that will not have any trees cut, therefore we do not expect windthrow to be a concern. Trees to be harvested will be either marked or designated by description or a combination of methods will be used. Trees smaller than 9 inches at dbh will be cut only for safety reasons. It is estimated that very few trees below 9 inches will be cut. The trees to be removed will be the higher value trees and trees with desirable structure for wildlife will be retained. A mix of tree species will be left.

Alt. 5

Treatment	Individual & Group Selection
% Retention of Ac, Trees/Ac or Vol	65 to 75% Vol
% Volume Removed	25-35%
Leave trees for Marten	No
Harvest Volume (MBF)	702
Cable Logging System Acres	None
Helicopter Logging System Acres	78
Yarded To	Barge

Stand Management Objectives:

Future stand will have several canopy layers. Overall stand will be uneven-aged. 65 to 75% of the stand is being retained to meet visual quality objectives, and to provide structure. Mostly western hemlock and redcedar regeneration is expected. Possible future treatments may include a release cutting.

Water Quality & Fisheries

Concern: Unit may contain small Class IV streams.

Mitigation: Verify Class IV streams. Helicopter yarding will provide adequate suspension over streams.

Soils

Concern: Harvest on steep slopes. Occurrence of TLMP organic soils in northern tip of the unit.

Mitigation: Locate unit boundary to avoid slopes over 72%, or use harvest prescription to retain trees on steep slopes for rooting strength. Field verify SMU 91B, if organic soils are found to occupy areas larger than 2 acres in size they will be excluded from the unit.

Wildlife

Concern: Unit contains high value marten habitat. Eagle nest location on adjacent beach. Beach travel corridor has been compromised due to past logging

Mitigation: Harvest prescription provides sufficient leave trees for marten. Follow MOU direction to avoid helicopter or ground disturbance within the nest buffer. Prescription will retain forest structure. Unit is located to leave a forested buffer between it and beach managed stand.

Visuals

Concern: Meet the Modification VQO. Unit is visible from the South Ernest Viewpoint.

Mitigation: The irregular-shaped boundary and 65-75% retention will mitigate visual concerns.

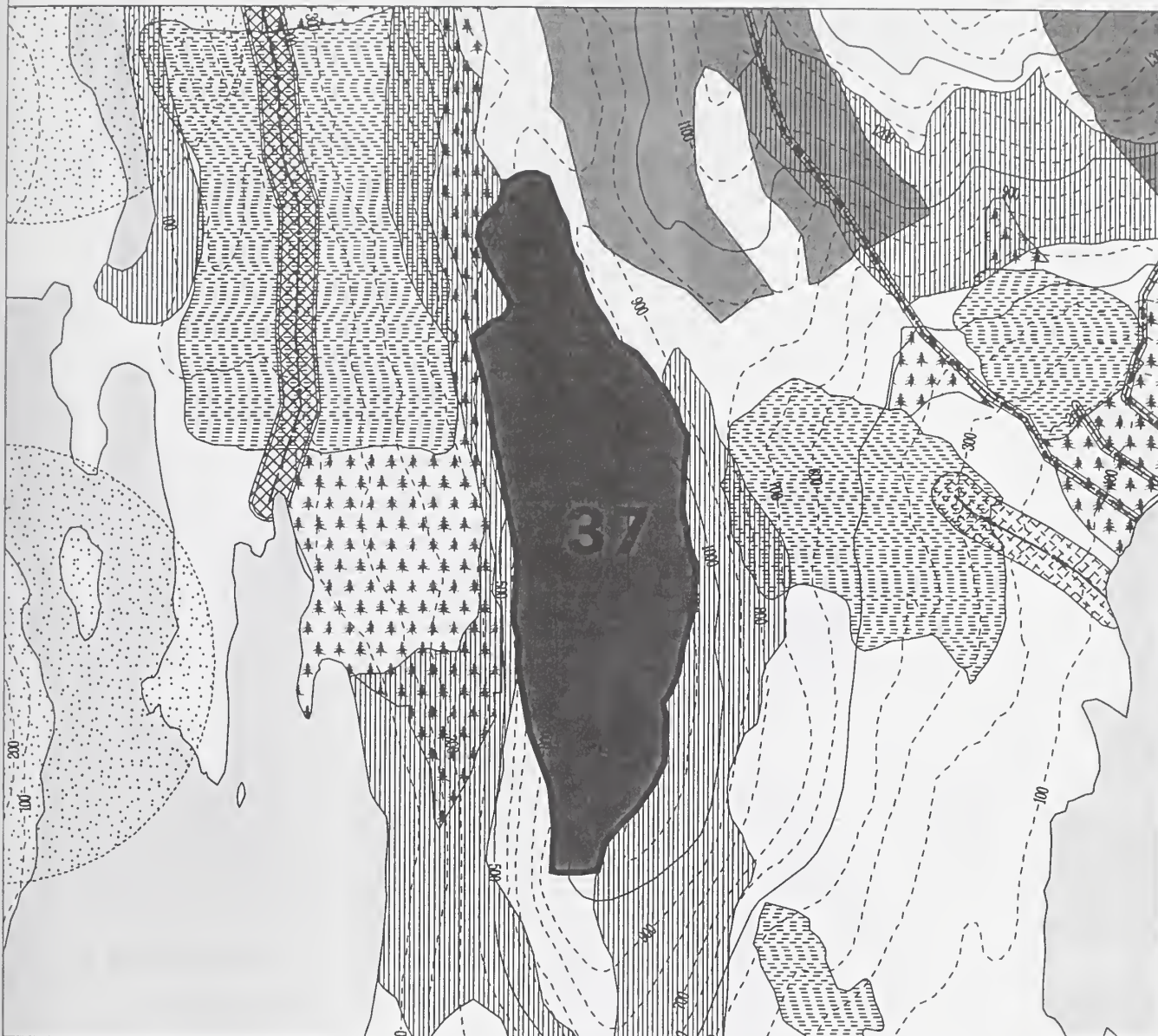
Layout and Contract Concerns: Timing restrictions, stream protection.

Mitigation Measures: F2, F4, W4, W6, W10, W16, V4.

78 ACRES

ALTERNATIVE 5

UNIT 37



Class I Streams

Class II Streams

Class III Streams

Class IV Streams



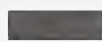
Eagle Nest Tree



Riparian Buffers



TTRA Buffers



Proposed cut unit



Adjacent proposed units



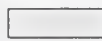
Marten Guidelines Apply



Existing Harvest Units



High Hazard Soils



Saltwater and Lakes



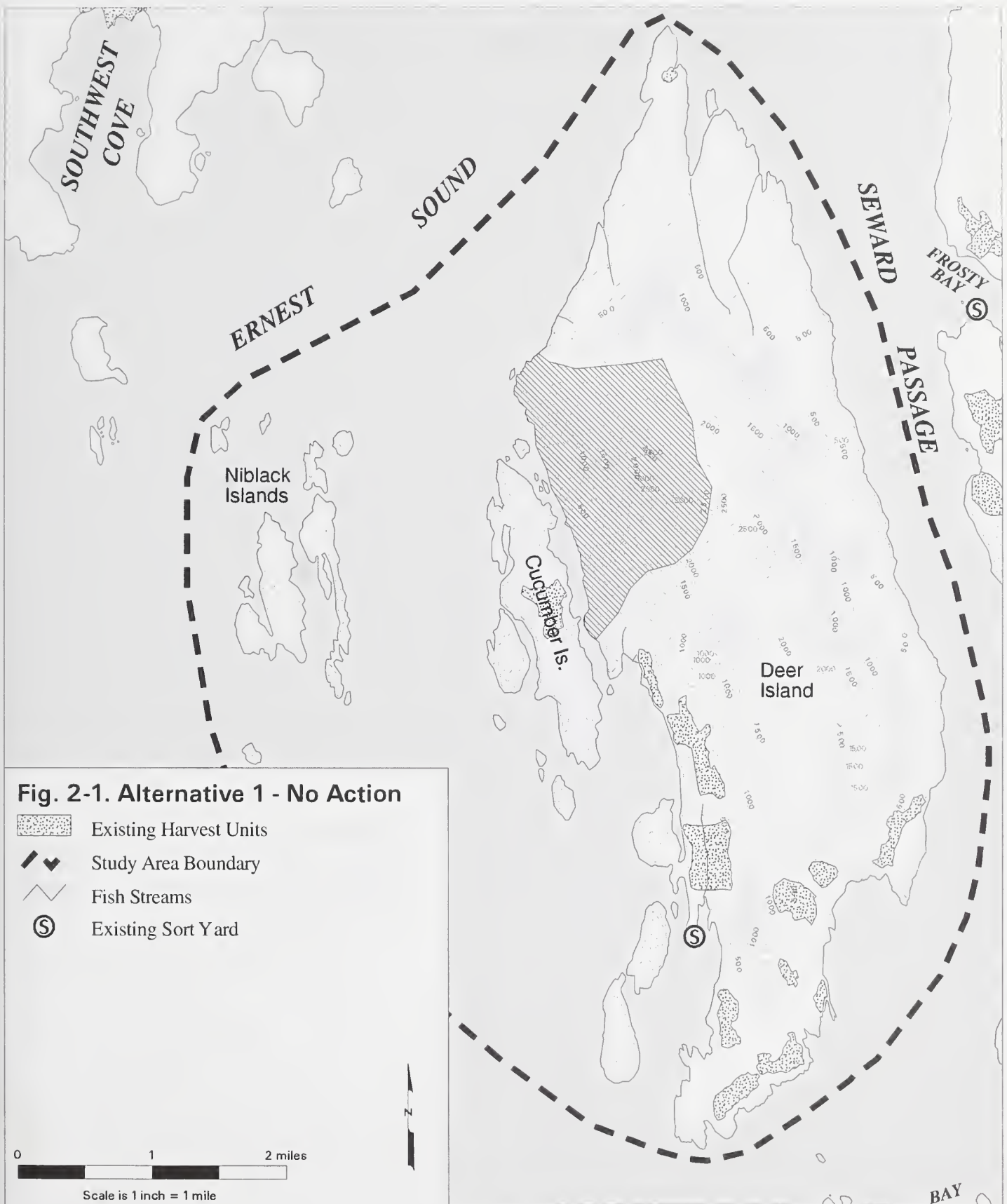
1/4 Mile Eagle Nest Buffers

Alternative	Prescription	Retention	Harvest System	Comments
5	ITM-Group Select	65-75	Helicopter	

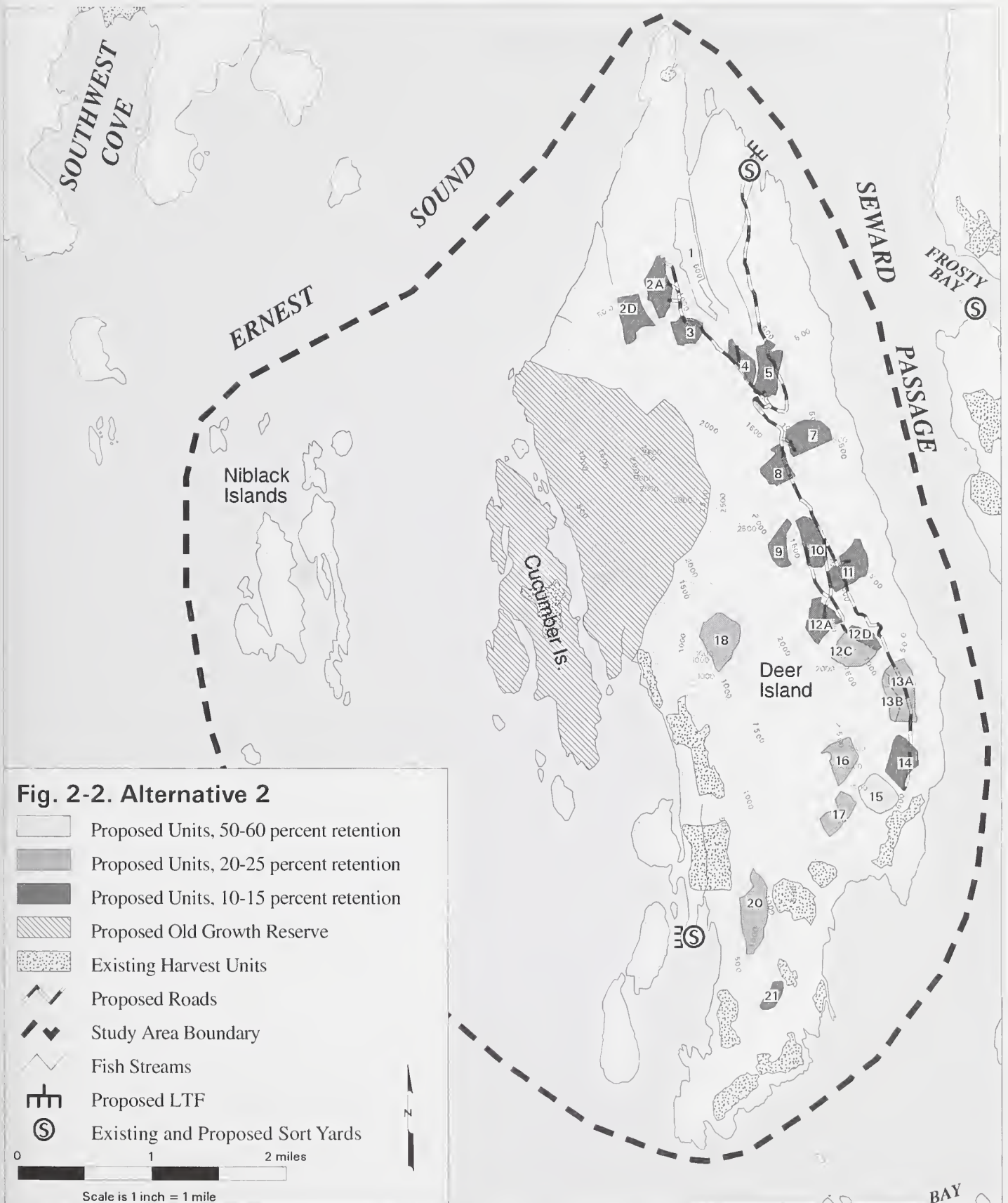
Scale: 1 inch = 1000 feet

Last Updated: January 04, 2000

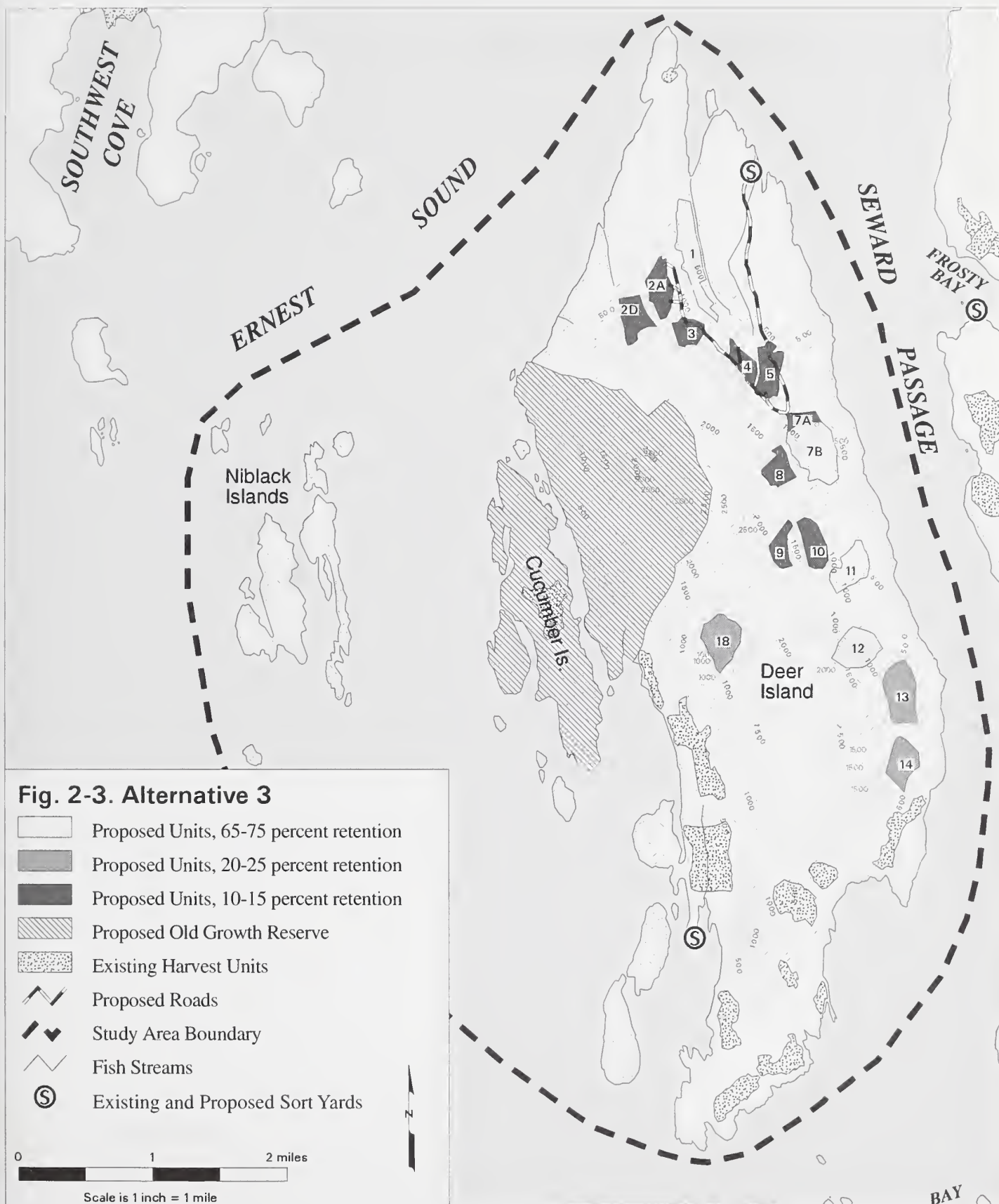
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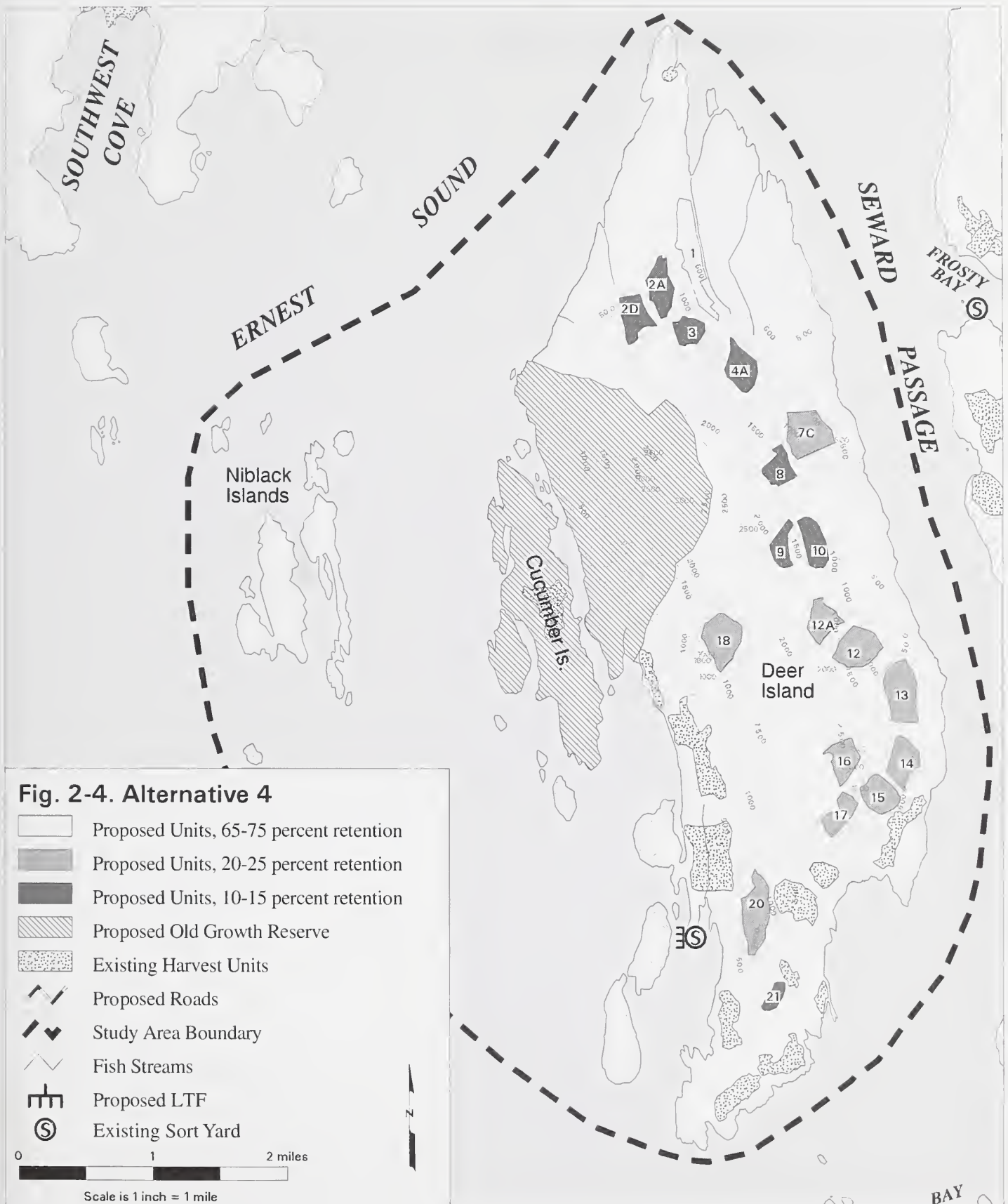
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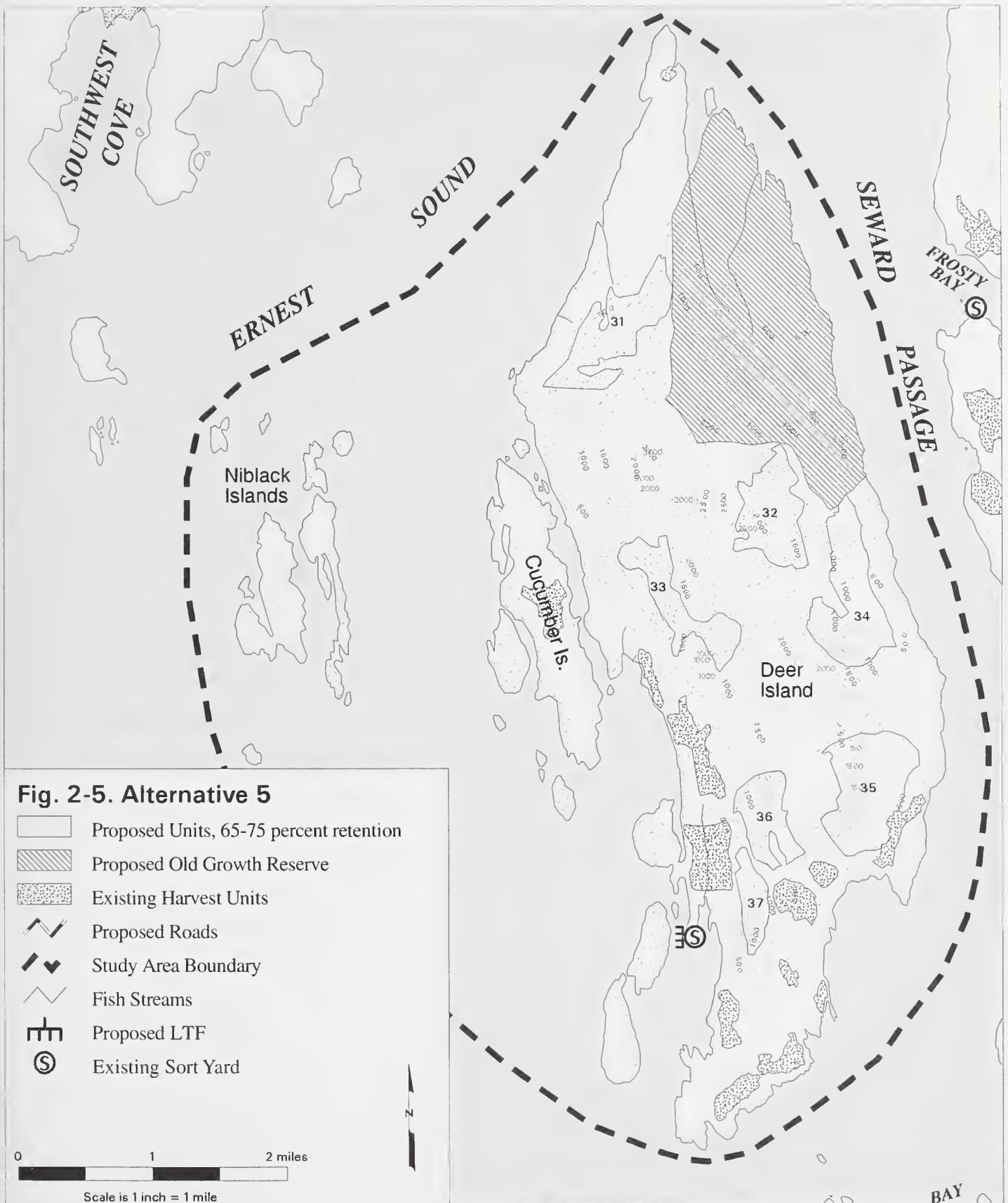
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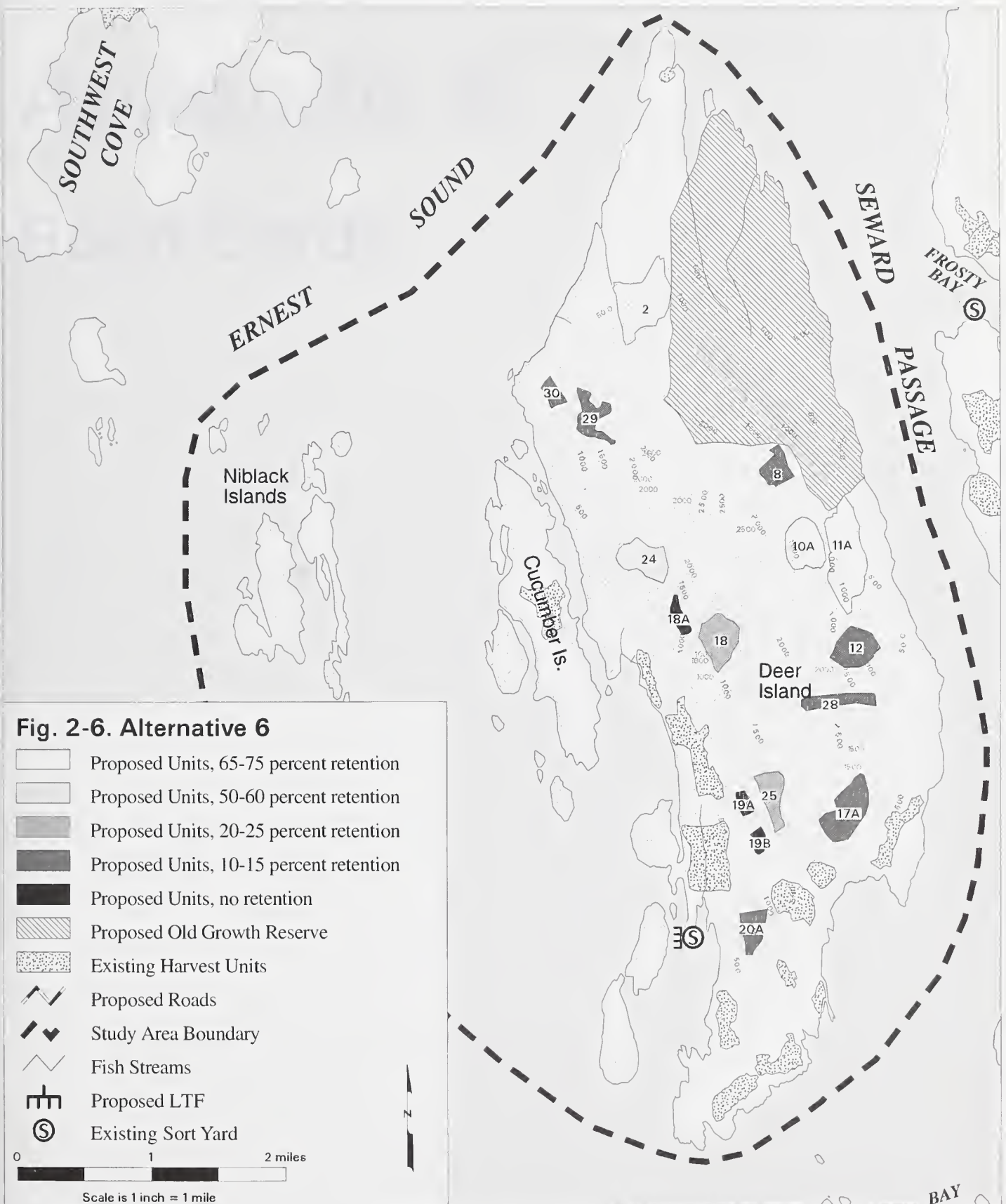


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Appendix A - Unit Cards

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Appendix A - Unit Cards

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Appendix B

Road Cards

В. И. Ленин

Ленин

Appendix B - Road Cards

ROAD DESCRIPTION

<u>Project</u>	<u>System</u>	<u>Land Use Designation</u>	
Kuakan	Deer Island	ML	
<u>Route No.</u>	<u>Route Name</u>	<u>Begin Termini</u>	<u>End Termini</u>
6700	Mainline Road	MP 0.00 at LTF	MP 5.63
<u>Begin MP</u>	<u>Length</u>	<u>Status</u>	
0	5.63	Opportunity	

General Design Criteria and Elements

<u>Functional Class</u>	<u>Service Life</u>	<u>Traffic Service Level</u>	<u>Surface</u>	<u>Width</u>	<u>Design Speed</u>	<u>Design Vehicle</u>	<u>Critical Vehicle</u>
L	LI	D	IMP	14	10	Low boy	Log truck

Intended Purpose/Future Use

Access for silvicultural activities. Will not be extended in the future. Close road to address wildlife concerns and reduce maintenance needs.

Maintenance Criteria

Operational Maintenance Level (Current or Initial Condition)	2
Objective Maintenance Level (Desired Future Condition)	1

Maintenance Narrative

Storage: remove or bypass all drainage structures to restore natural drainage patterns, add waterbars as needed to control runoff and block access by motorized vehicles. Consistent with Alaska Forest Practices Regulations "closed" status.

Operation Criteria

Highway Safety Act: No **Jurisdiction:** National Forest ownership

Travel Management Strategies **Encourage:** N/A

Accept: Nonmotorized (hikers, bikers and wheel borrows)

Discourage: N/A

Prohibit: Motorized vehicles (ORVs, motorcycles, snowmobiles)

Eliminate: Standard passenger and high clearance vehicles.

Travel Management Narrative

The road will be closed to motorized use when the timber sale is completed. A gate will be installed near MP 0 and the road will be stored. Stream crossing structures will be removed. Determined individuals may find a way to use off road vehicles on this road, but will be discouraged by the difficulty. If road is needed in the future, drainage structures will be replaced.

Appendix B - Road Cards

Site Specific Design Criteria Road 6700

Road location: The main objective is to locate the road to maximize the amount of land that is suitable for cable harvest. The road will follow the timber along a bench at approximately 1000 feet elevation. This location will allow uphill yarding which minimizes soil disturbance, gives more options for silvicultural systems other than clearcutting, and provides access for cable yarding above the road. Road location below this bench would be unacceptable due to steep sideslopes. The road begins at the North LTF and climbs for 2.6 miles to reach the bench. The grades for this first section will contain a high percentage of favorable 15% with pitches of 17%. The second part ends at nearly the same elevation, with pitches to 15% (both adverse and favorable) encountered as dictated by topography.

Wetlands: The road is located on forested wetlands from approximately MP 0.25 to MP 1.75. Most of the northeast corner of Deer Island is classified as wetlands (see Road 6700 Map). The road is located at the present location because there is no route from the LTF to the harvest units without crossing wetlands. When it is necessary to cross an open muskeg, the road will be located near the edge of the muskeg rather than through the middle of it.

Erosion control: An erosion control plan for construction and maintenance will be developed by the contractor and approved by the Contracting Officer (BMP 14.5). All areas of organic or mineral soil exposed during construction will be revegetated using native species (BMP 12.17, 14.8). At MP 2.15 - MP 2.60 the route crosses an old, timbered landslide with side slopes of 65% - 75% for about 800 feet. Full bench construction will be required and excavated material will be end hauled. Some type of retaining wall may be required. Even with this construction technique, there is concern about the stability of the route, including a high risk of potential slope failures that can occur during right-of-way drilling and blasting and a high risk of cutslope instability. Soils are poorly drained in this area, and with the presence of saturated organics on the surface, these sites are prime candidates for liquefaction failure during blasting. Liquefaction failures can run downslope a long distance and incorporate adjacent loose slope materials in the process. The slope failure(s) would catch on the bench just below the lowermost steep section, creating a long landslide scar.

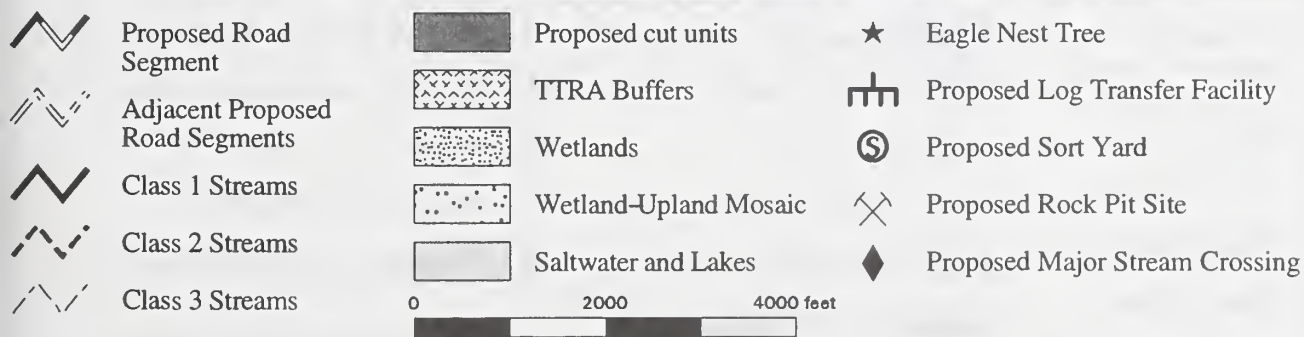
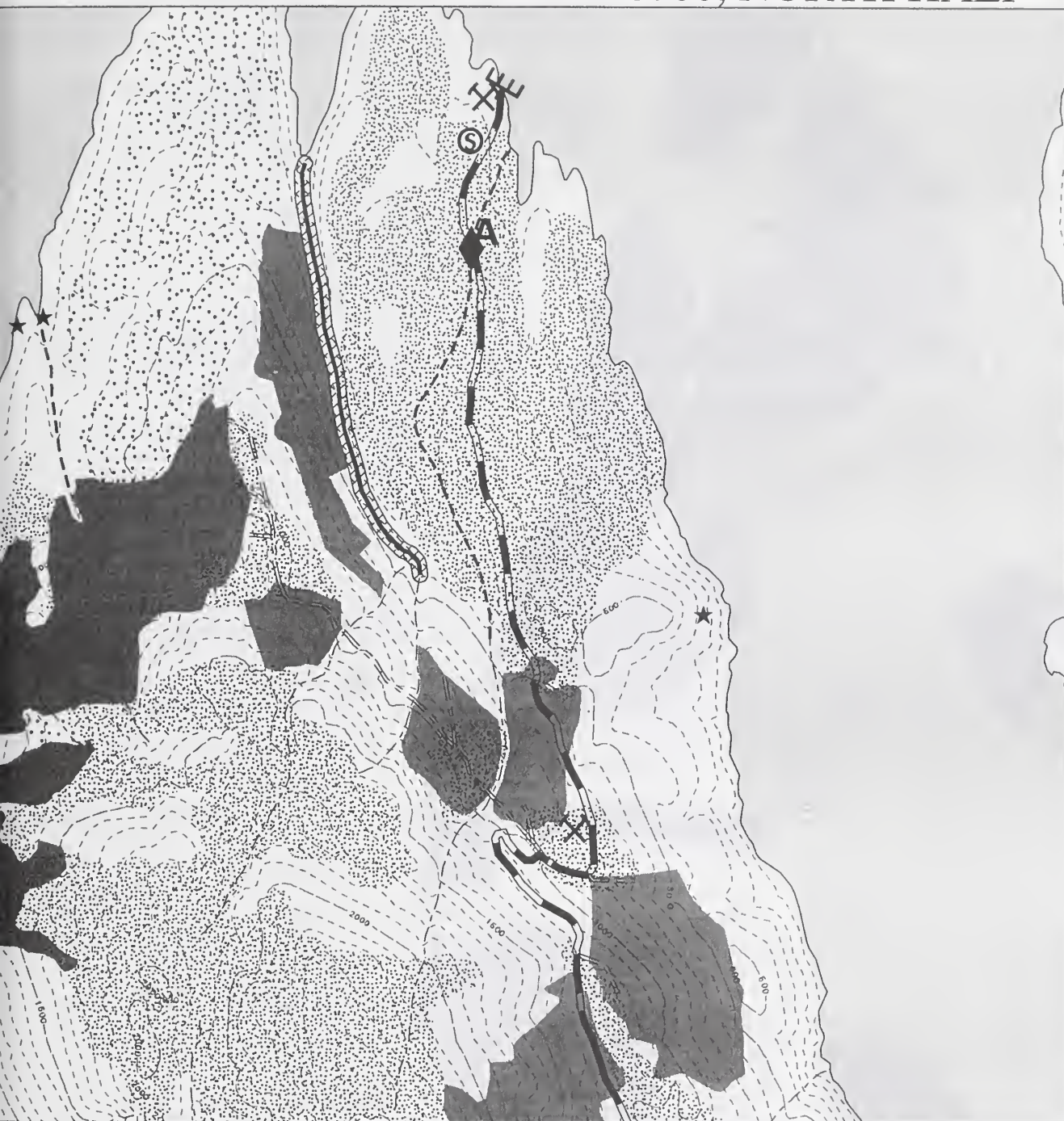
Rock pits: During periods of high rainfall (as defined in current Regional specifications), blasting operations will be suspended at quarries near potentially unstable sites where ground vibration may induce mass movement (BMP 14.6). Rock for initial construction is planned to come from the proposed rock pit at the beach. Other rock sources may be at MP 0.36 and 1.91

Major Stream Crossings:

- A) MP 0.40 Stream Class II Channel Type HC1 BF Width 7 ft. BF Depth 1 ft.
Left Bank Incision 3 ft. Right Bank Incision 15 ft. Substrate bedrock Gradient 6 %
Structure 60" cmp
Narrative: **Lost Creek.** Stable location, no notable debris or bedload. Design for resident fish passage (about one mile of habitat upstream of structure). Uneven bank incision will require extra fill on approach from LTF.
- B) MP 4.42 Stream Class III Channel Type HC2 BF Width 20 ft. BF Depth 1.5 ft.
Incision 10 ft. Substrate boulder Gradient 15 % Structure 60" cmp
Narrative: Normal installation.
- C) MP 5.28 Stream Class III Channel Type ? BF Width ? ft. BF Depth ? ft.
Incision ? ft. Substrate ? Gradient ? % Structure 48-60" cmp
Narrative: No descriptive field notes are available for this stream. If Alternative 2 is selected, additional detail will be provided in the FEIS.

Mitigation Measures: F6, F8, F9, F10, F11, W7, W8, W9, R1, V5, V6, S1

ROAD NUMBER 6700, NORTH HALF



Last Updated: October 07, 1999

ROAD NUMBER 6700, SOUTH HALF



Proposed Road Segment



Adjacent Proposed Road Segments



Class 1 Streams



Class 2 Streams



Class 3 Streams



Proposed cut units



TTRA Buffers



Wetlands



Wetland-Upland Mosaic



Saltwater and Lakes



Eagle Nest Tree



Proposed Log Transfer Facility



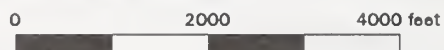
Proposed Sort Yard



Proposed Rock Pit Site



Proposed Major Stream Crossing



Scale is 1 inch = 0.37 miles

Last Updated: October 07, 1999

Appendix B - Road Cards

<u>Project</u>	<u>System</u>	<u>Land Use Designation</u>	
Kuakan	Deer Island	ML	
<u>Route No.</u>	<u>Route Name</u>	<u>Begin Termini</u>	<u>End Termini</u>
6701	North Road	MP 2.00 on rd. 1	MP 1.35
Begin MP	Length	Status	
0	1.35	Opportunity	

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Design Speed	Design Vehicle	Critical Vehicle
L	LI	D	IMP	14	10	Low boy	Log truck

Intended Purpose/Future Use

Access for silvicultural activities. This road will not be extended in the future. Road will be closed to address wildlife concerns and reduce maintenance needs.

Maintenance Criteria

Operational Maintenance Level (Current or Initial Condition) 2

Objective Maintenance Level (Desired Future Condition) 1

Maintenance Narrative

Storage: remove or bypass all drainage structures to restore natural drainage patterns, add waterbars as needed to control runoff and block access by motorized vehicles. Consistent with Alaska Forest Practices Regulations "closed" status.

Operation Criteria

Highway Safety Act: No **Jurisdiction:** National Forest ownership

Travel Encourage: N/A

Management Strategies Accept: Hikers, bicycles

Discourage: N/A

Prohibit: Motorized off road vehicles

Eliminate: Standard passenger and high clearance vehicles.

Travel Management Narrative

The road will be closed to motorized use when the timber sale is completed. A gate will be installed near MP 0 and the road will be stored. Stream crossing structures will be removed. Determined individuals may find a way to use off road vehicles on this road, but will be discouraged by the difficulty. If road is needed in the future, drainage structures will be replaced.

Appendix B - Road Cards

Site Specific Design Criteria Road 6701

Road location: The main location objective is to follow the timber along a series of benches at approximately 1000 ft. elevation. This will allow uphill yarding which minimizes soil disturbance and gives more options for silvicultural systems other than clearcutting and provides access for cable yarding above the road. The road begins on a flat area just before the full bench area on Road 6700 at elev. 800 ft. and climbs for 1/4 mile to reach a site for the first major stream crossing. The grades for this first section will contain a high percentage of favorable 15%. The second part ends at nearly the same elevation, with pitches to 15% (both adverse and favorable) encountered as dictated by topography.

Wetlands: Wetlands are crossed near the end of the road. Most of the wetlands support a mixed conifer plant community. Road location on wetlands was minimized to the extent possible with the objective of minimizing impacts to peatland.

Erosion control: An erosion control plan for construction and maintenance will be developed by the contractor and approved by the Contracting Officer (BMP 14.5). All areas of organic or mineral soil exposed during construction will be grass seeded and fertilized (BMP 12.17, 14.8). Where the route cross a section of ground with 65% - 75% sideslopes, full bench construction will be required, and excavated material will be end hauled.

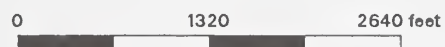
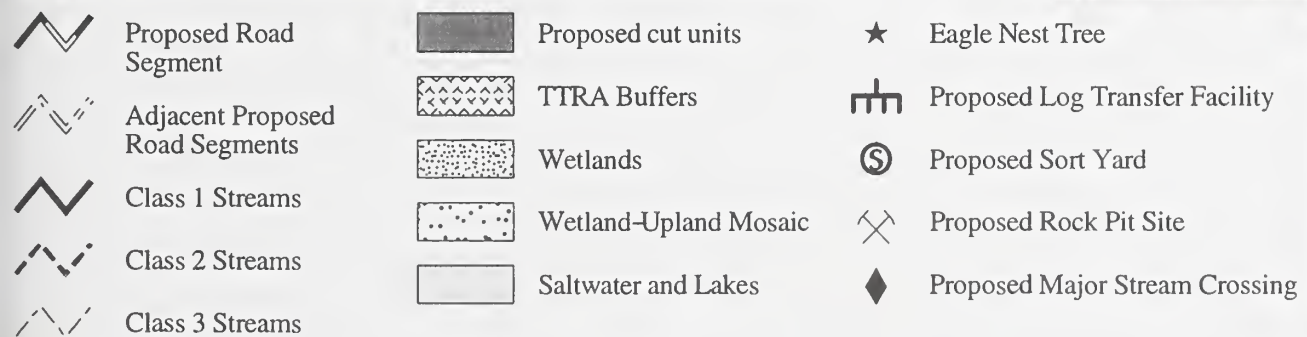
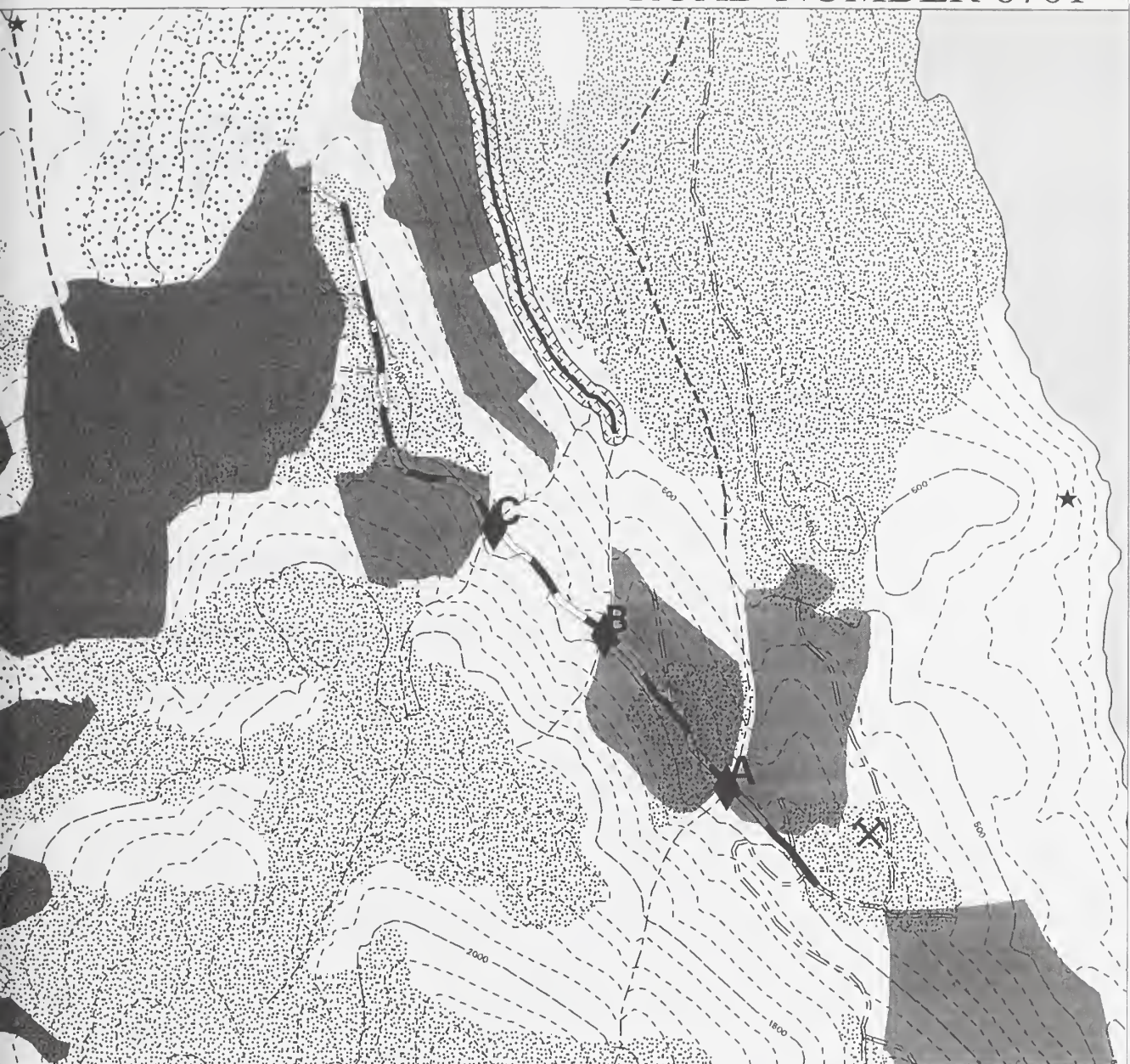
Rock pits: During periods of high rainfall (as defined in current Regional specifications), blasting operations will be suspended at quarries near potentially unstable sites where ground vibration may induce mass movement (BMP 14.6). No quarry sites have been identified on this road.

Major Stream Crossings:

- A) MP 0.21 AHMU III Channel Type HC5 BF Width 20 ft. BF Depth 2 ft.
Incision 3 ft. Substrate boulder Gradient 25 % Structure slab or log bridge
Narrative: **Lost Creek.** Steep class III stream, crossing is above alluvial fan where channel is more stable. Active transport of boulder-sized bedload. Use minimal fill and remove structure after timber sale.
- B) MP 0.52 AHMU III Channel Type HC5 BF Width 15 ft. BF Depth 2 ft.
Incision 3 ft. Substrate boulder Gradient 50 % Structure slab or log bridge
Narrative: **Canyon Creek tributary.** Steep class III stream. Active transport of boulder-sized bedload. Use minimal fill and remove structure after timber sale.
- C) MP 0.75 AHMU III Channel Type HC6 BF Width 30 ft. BF Depth 2 ft.
Incision 15 ft. Substrate boulder Gradient 45 % Structure slab or log bridge
Narrative: **Canyon Creek tributary.** Steep class III stream. Active transport of boulder-sized bedload. Use minimal fill and remove structure after timber sale. Minimize road cut into stream sideslopes.

Mitigation Measures: F7, F8, F9, F10, F11, W7, W9, R1, S1

ROAD NUMBER 6701



Scale is 1 inch = 0.25 miles

Last Updated: October 04, 1999

Appendix C

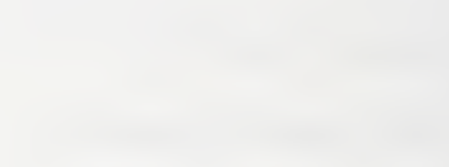
Monitoring and Improvement Projects

Monitoring Plan

Sale Area Improvement

Appendix C

Line graph showing
transportation trends



Appendix C

Monitoring and Improvement Projects

Monitoring Plan

Log Transfer Facility

Objective: Determine compliance with the Alaska Water Quality Standards for settleable residues in marine waters.

Method: SCUBA divers run transects and record depth and areal extent of bark accumulation once before and annually during logging activities.

Action: Submit bark monitoring report to EPA and ADEC on or before January 31st of the calendar year following the survey.

Accountability: This is a Forest Plan monitoring question as well as an LTF permit requirement. Wrangell Ranger District engineering staff are responsible for coordinating the dives with the Tongass engineering staff.

Cost: \$1000

Best Management Practice Implementation

Objective: Evaluate application of BMPs for water quality and fish habitat protection.

Method: Follow Tongass National Forest BMP implementation monitoring protocols. All roads and units are inspected for contract compliance by engineering inspector and sale administrator as they are completed. Some Kuakan Timber Sale roads (if built) or units may be randomly selected for interdisciplinary monitoring.

Action: If protection is inadequate, apply corrective measures. If protection measures are inadequate or unsuitable, modify future recommendations.

Accountability: This is a Forest Plan monitoring question as well as a commitment in the Forest Service Memorandum of Agreement with Alaska Department of Environmental Conservation. Wrangell Ranger District watershed staff are responsible for coordinating BMP implementation monitoring with other district personnel.

Cost: \$1000

C - Monitoring and Improvement Projects

Best Management Practice Effectiveness

Objective: Evaluate the effectiveness of BMP application at protecting water quality and fish habitat.

Method: Address priorities indicated in Forest Plan. Applicable questions include fish passage, stream buffers, landslides, etc. Monitoring sites may or may not be selected on Deer Island. Follow Tongass National Forest BMP effectiveness monitoring protocols (currently under revision).

Action: If protection is inadequate, additional mitigation may be necessary. In some cases, BMP modifications may be recommended.

Accountability: This is a Forest Plan monitoring question as well as a commitment in the Forest Service Memorandum of Agreement with Alaska Department of Environmental Conservation. Since most of effectiveness monitoring is conducted with Tongass-wide protocols, Wrangell Ranger District watershed and fisheries staff are responsible for coordinating BMP effectiveness monitoring with other Tongass personnel.

Cost: Variable

Regeneration

Objective: To determine if there is adequate natural stocking after harvest.

Method: Field exams of each unit.

Action: If adequate stocking is not present in any harvest unit, it will be planted to bring stocking up to at least 300 trees per acre.

Accountability: This is a Forest Plan monitoring question and a National Forest Management Act requirement. Wrangell Ranger District silviculture staff are responsible for regeneration exams.

Cost: \$5,000.

Harvest Prescriptions

Objective: To determine if stand conditions met the resource objectives after harvest. Were multiple canopy layers left? How does canopy cover change? Which harvest prescriptions released leave trees? Were adequate den/nesting trees left in the units? What is wildlife use within the harvest units? Did understory forbs and shrubs respond to increased light?

Method: Establish permanent plots in a sample of units to be measured before, immediately after, and five years after harvest.

Action: The interdisciplinary team will review the results and determine if the prescriptions met the resource objectives. The results will be used to refine future prescriptions.

Accountability: This is a project monitoring question. Wrangell Ranger District silviculture staff will coordinate with the project ecologist and wildlife biologist to select sites and data to be collected.

Cost: \$10,000

Blowdown

Objective: To determine if there is blowdown in stream buffers, reserve clumps, partial harvest units, and along unit edges. Did blowdown occur in areas thought to be susceptible to blowdown?

Method: Aerial flights immediately after and three to five years after harvest.

Action: Where blowdown occurred, assess resource damage through ground reconnaissance as necessary (for example, along streams). Use the results to refine future unit layout.

Accountability: Stream buffer stability is a Forest Plan monitoring question. Other types of blowdown fall under project monitoring questions. Wrangell Ranger District silviculture staff will coordinate with watershed and fisheries staff to schedule flights.

Cost: \$1000

C - Monitoring and Improvement Projects

Scenic Resources

Objective: Determine if harvest prescriptions were implemented and effective in meeting the visual quality objectives. Determine how close resulting harvest is to the desired condition.

Method: Before and after photos will be evaluated and site inspections will be made two years following harvest.

Action: Produce a chart showing the number of acres treated, the prescription and the result.

Accountability: This is a project monitoring question, but also addresses a Forest Plan monitoring question. Wrangell Ranger District planning staff will conduct this monitoring.

Cost: \$2000

Marine Slash

Objective: To prevent logging slash escaping from LTFs or processing barges from posing a hazard to navigation or creating problems for sport and commercial fishing.

Method: The timber sale administrator will watch for floating slash.

Action: The contract will require slash containment and pick-up by the operator.

Accountability: This is a project monitoring question. Wrangell Ranger District timber sale administrators will enforce the contract.

Cost: \$500

Wildlife Harvest

Objective: Determine if changes in harvest of big game and furbearers are consistent with predictions in the EIS and subsistence report. Harvest rates are important in assessing whether the supply of game is adequate to meet demand by subsistence hunters and trappers (martens), and to ensure viability of certain species (wolves).

Method: Annually review ADFG harvest data to determine subsistence versus non-subsistence harvest and changes in the rate of harvest over time. If a marked increase or decrease in harvest is observed, consult with ADFG to determine the cause.

Action: If non-subsistence harvest or increasing total harvest trends indicate that future populations may be insufficient to meet subsistence demand, assess hunting regulations and travel management (road access, if roads are built) to determine needed changes.

Accountability: This is a project monitoring question. Wrangell Ranger District wildlife biologist is responsible.

Cost: \$350 per year

Road Closure Effectiveness

Objective: To determine if gates are effective in eliminating motorized vehicle traffic. This will give us an idea of the amount of disturbance and hunting that is occurring in the Project Area. This monitoring is only applicable to Alternatives 2 and 3, which include road construction.

Method: Look for motorized vehicle tracks or gate damage on an annual basis.

Action: If unauthorized vehicle use occurs, additional barriers will be installed. Gates that are damaged or not functioning will be replaced or improved.

Accountability: This is a project monitoring question. Wrangell Ranger District engineering staff will conduct annual inspections.

Cost: \$1000 per year

C - Monitoring and Improvement Projects

Raptor Nests

Objective: To determine if protection measures are adequate to promote continued use of raptor nests.

Method: The goshawk nests found on Deer Island will be visited annually from now until harvest begins, and for not less than two years following harvest to determine if the nest remains active.

Action: If the nest is inactive for two years, protection measures may be removed or the size of the buffer for nests may need to be increased to promote continued use of the nest.

Accountability: This is a project monitoring question. Wrangell Ranger District wildlife staff will conduct the monitoring.

Cost: \$500 annually

Sale Area Improvement

Tree planting - Units that are not adequately stocked within five years after harvest will be planted to increase stocking. Units may also be planted to increase the species diversity of Sitka spruce and Alaska yellow cedar. This project complies with Forest Service K-V Handbook direction (FSH 2409.19) and may be listed in the Kuakan Sale Area Improvement Plan. Tree planting is not likely to occur in harvest units that have a harvest prescription that retains a high percentage of the existing stand.

Bear Creek riparian restoration - Consider removing logging slash left from the 1988 harvest, riparian thinning prescriptions, and fertilization to accelerate growth of large trees along stream.

Appendix D

LTF Site Selection, Design, and Marine Effects

Log Transfer Facility

Appendix D

LTF Site Selection, Design, and Marine Effects

Log Transfer Facility

A log transfer facility (LTF) is the location where logs are transferred between a ground-based transport system of roads and trucks and a water-based transport system of rafts, barges, and tugboats. Appendix G of the Revised Forest Plan (USDA Forest Service, 1997) contains LTF siting guidelines. The guidelines were developed by the Alaska Timber Task Force Log Transfer Facility Guidelines Technical Subcommittee in 1985. The guidelines identify physical characteristics necessary for safe and efficient log transport as well as minimum requirements for mitigation of water quality and aquatic habitat effects. We consider all of the guidelines and develop LTFs which represent the best mix: allowing activities to proceed while meeting all applicable statutory and regulatory requirements. The LTFs undergo a complex and rigorous permitting process involving multiple federal and state agencies. The information contained in this appendix is intended to facilitate the permitting process and to provide information to the public and agencies on Deer Island LTF locations, construction, operation, and monitoring.

No roads currently exist on Deer Island. The Deer Island West LTF was constructed on the southwestern portion of Deer Island in 1988 in conjunction with the Deer Island Timber Sale (Figure D-1). That LTF site was used as a helicopter landing and refueling location, as a helicopter log-landing zone, and for de-watering, sorting and bundling logs into rafts for towing to mills. The developed site included a low-angle rock ramp where loosely rafted logs were towed to and removed from the water with a hydraulic shovel loader. The logs were placed in scaling bays for measurement, then placed in bundling racks. The log bundles were then placed in the water for rafting by a stationary crane, which was positioned near the face of a rock bulkhead. When the Deer Island sale was completed in 1990, the 5 acre LTF site was reclaimed by removing the rock ramp, reshaping the upland sortyard, seeding the uplands with grass and clover and planting approximately 100 Sitka spruce seedlings. A SCUBA dive survey of the West LTF site was completed in 1997. Bark depth of 0 to 8 cm was present with area coverage of two to five percent, which is well within the permit standards for LTFs.

All action alternatives for the Kuakan project consider reopening the existing Deer Island West LTF. Actual redevelopment of the site would depend on the timber sale purchaser electing to use the site. Recent monitoring at the site indicates that the past use of the LTF has not resulted in long-term detrimental impacts to the marine environment. Therefore, we would allow the timber sale operator to reconstruct the site to its previous condition, or to develop the site with a less-impactive design. We have applied for permit renewals for the Deer Island West site. A purchaser may choose to use the established LTF site, or may elect to use barges for landing and processing logs flown from helicopter units on the west side of Deer Island.

Appendix D - LTF Site Selection, Design, and Marine Effects

Most of the Deer Island shoreline is steep and potential road location is limited to the eastern and northern portions of the island. Alternatives 2 and 3 depend on development of a road transportation system that would originate at a new proposed LTF on the northeast tip of Deer Island. Early in the planning process, we identified several potential LTF sites for the Kuakan Project Area (Figure D-1). In 1997, a field investigation was conducted with the US Fish and Wildlife Service (USFWS unpublished LTF field investigation report, 1997). Six locations were checked by diving with SCUBA gear. In their report, the USF&WS recommends against development of any of these locations for placing bundled logs into the water. All sites had robust beds of eelgrass as well as dense stands of kelp and possible commercial quantities of sea cucumbers. Biological diversity is relatively high with a high number of different species present. Of the six sites that the USF&WS dove, one site (north 2) was identified as having the least number of animals present and the fewer sea cucumbers noted. Development at this location would affect fewer species than any of the other locations.

Responses to project scoping indicated concerns with LTF development as well. Construction of the LTF will be difficult to visually screen from passing boats. There is commercial crabbing and shrimping that takes place around the northern and eastern shores of Deer Island as well as salmon and halibut fishing. The northeastern shoreline of Deer Island is not very well protected from winter storms and does not offer a good location for building log rafts. Loose logs or bundles that may escape from log rafts in the area may foul fishing gear.

To address concerns about development of a new log transfer facility, we will incorporate the following features in LTF design and operation:

- The facility will be designed with the least amount of ground disturbance possible, and retain as much natural vegetation as possible.

- The LTF will be a low angle rock ramp with minimal log bulkhead to provide for barge loading and unloading.

- Logs will be loaded directly to a barge. No log rafts will be constructed at the LTF.

- The rock ramp and bulkhead will be removed upon completion of the sale.

Only alternatives 2 and 3 propose construction of the LTF on the northeastern shoreline of Deer Island. Alternatives 4, 5 and 6 are helicopter alternatives and do not propose development of a new LTF. Harvest volume from these alternatives would be yarded directly to barges along the shoreline.

Site specific information pertaining to the guidelines developed by the Alaska Timber Task Force Log Transfer Facility Guidelines Technical Subcommittee for the proposed LTF follows.

Siting Guidelines

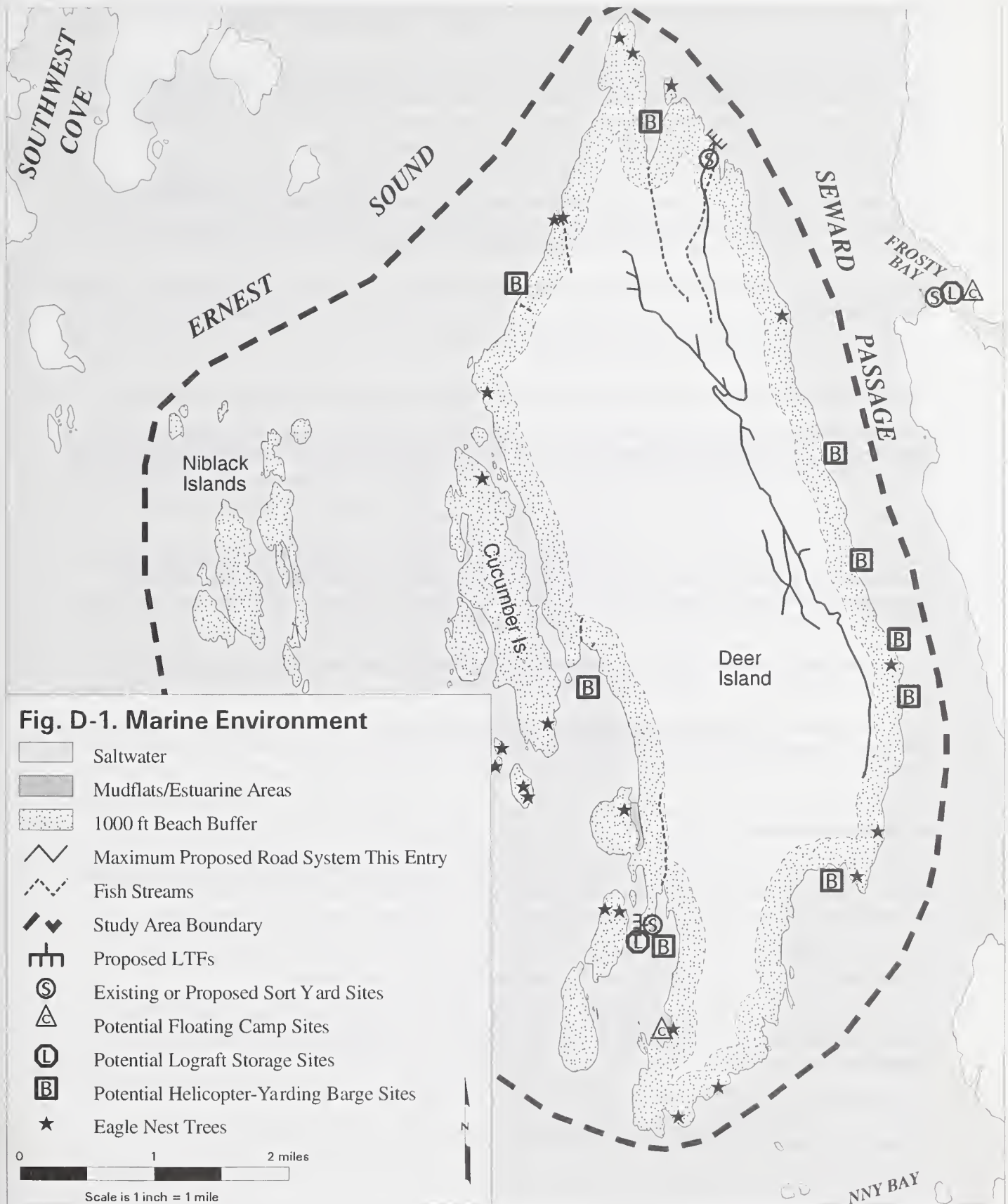
S1. Proximity to Rearing and Spawning Areas: Avoid sites within 300 feet of the mouth of anadromous fish streams, or in areas known to be important for fish spawning or rearing.

The Kuakan LTF site is over 5000 feet shoreline distance southeast of the nearest anadromous fish stream (Canyon Creek), which flows into the small bay 1/2 mile north of the proposed LTF. There is a resident fish stream (Lost Creek) approximately 800 feet shoreline distance south of the proposed LTF containing cutthroat trout. Both streams were surveyed by electroshocker in 1997.

S2. Protected Locations: Choose sites in weather-protected waters with bottoms suitable for anchoring and with at least 20 acres for temporary log storage and log booming.

Protection from wind and high seas is limited around Deer Island. All sites considered on the northeast shore of the island are somewhat exposed to northeasterly winds out of Bradfield Canal and to southeasterly winds up Seward Passage.

Log rafting or temporary log storage will not be provided for or allowed at this site. All logs will be transferred directly to barges for shipment to area mills.



Appendix D - LTF Site Selection, Design, and Marine Effects

S3. Upland Facility Requirements: Choose sites with proximity to at least five acres of relatively flat uplands. The LTF should provide at least 60 linear feet of operating face along the water.

Kuakan LTF is within 700 feet of a proposed sort yard. This sort yard will be within the 1000 foot beach fringe. Logs could be transported from the sort yard to the LTF by front-end loader. The size of the sort yard will be limited to about 5 acres, large enough to accommodate log storage areas of sufficient size to stockpile logs for barge-only operations.

The LTF site will require at least 70 feet of tree clearing at the high water line for passage of log bundles. The actual operating face of the LTF structure would be narrower, only wide enough to handle equipment to be loaded and unloaded. There is adequate room at the site for 60 feet of operating face along the water, however, visual mitigation measures incorporated into the LTF design may limit the operating face.

S4. Safe Access to a Facility from the Uplands: Choose sites where access roads to the LTF can maintain a grade of ten percent or less.

The access road can be constructed at a 10-15% grade.

S5. Bark Dispersal: Choose sites where currents are likely to disperse sunken or floating wood debris.

Flushing potential is good, given the currents present through Seward Passage and out of the Bradfield Canal. Dispersion of sunken or floating wood debris should not be a concern, since logs will be loaded directly onto barges instead of being placed in the water and rafted.

S6. Site Productivity: Choose sites with the least productive intertidal and subtidal zones.

All of the sites looked at were considered highly productive. According to the USF&WS, "[t]he North 2 site (proposed for the Kuakan LTF) had the least number of animals present and fewer sea cucumbers were noted. Development at this location would affect fewer species than at the other locations.." Requiring logs to be barged rather than rafted will help mitigate concerns related to the intertidal and subtidal zones.

S7. Sensitive Habitat: Avoid sites on or adjacent to sensitive habitats: extensive tideflats, salt marshes, kelp or eelgrass beds, seaweed harvest areas or shellfish concentration areas.

All sites investigated had robust beds of eel grass and dense stands of kelp along with commercial quantities of sea cucumbers. Requiring logs to be barged rather than rafted will help mitigate concerns related to the sensitive marine habitats.

S8. Safe Marine Access to Facilities: Choose sites that are safely accessible to tugboats with log rafts at most tides and on most winter days.

Tide changes may affect accessibility at the site and barges may not be able to be loaded or unloaded when the tide is below +1 foot. Winter weather (wind and high seas) may be a limiting factor at the site since the location is not well protected. Winter weather is likely to be a limiting factor for all logging operations on Deer Island.

S9. Storage and Rafting: Choose sites where stored logs, log bundles, or log rafts will not ground at low tide. Minimum depths of 40 feet Mean Lower Low Water are preferred for log storage areas.

No storage of logs, log bundles or log rafts will be allowed in the LTF area. Frosty Bay, approximately 2 miles away on the east shore of Seward Passage, is currently permitted as a log storage area and may be used for temporary storage.

S10. Bald Eagle Nest Trees: Avoid sites within 330 feet of bald eagle nests.

The nearest documented bald eagle nest is about 2800 feet northwest of the Kuakan LTF site.

Construction and Operation Guidelines

C1. LTF Design: Design LTFs to be least environmentally damaging as practicable, considering economics, facility requirements, physical site constraints, site usage (timber volume) and duration, water quality and habitat mitigation, other potential uses.

Most environmental concerns are addressed through the siting guidelines described above for the site. Remaining concerns associated with erosion control, fish habitat protection, and visuals are addressed through design measures and operating guidelines described below.

Physical constraints due to steep topography, as well as visual objectives, present design challenges at the site. The LTF will require a separate upland site for log sorting, storage, and equipment maintenance.

We anticipate a maximum potential wood volume of about 17 MMBF from this sale. Depending on the alternative, some or all of this volume will go directly from harvest units to barge by helicopter, bypassing the LTF entirely (see Table 3-26). A short rock ramp with a minimal-height bulkhead made from native log materials is the most likely design for the site.

C2. Fill Structures: Design and construct fill structures to prevent erosion, pollution, and structural displacement.

Existing beach topography will be incorporated into the design as feasible. Fill structures will be necessary to provide bulkheads and minimize access road grades coming into the LTF. These structures will be minimum height native log and/or stable rock revetments reinforced with riprap below storm tide level to protect fill from erosion. The bulkhead and rock ramp will be removed upon completion of the sale.

C3. Timing of Inwater Construction: If necessary, limit adverse impacts to marine resources and avoid conflicts with other users through construction and operation timing restrictions.

Development of the Kuakan LTF will avoid conflicts with commercial fishing in Seward Passage. No construction or operation timing restrictions specific to the LTF are proposed.

C4. Bark Accumulation Management: Use Best Management Practices to control intertidal and submarine accumulations of bark and other debris.

Requiring logs to be loaded directly unto barges will minimize potential for bark accumulation.

C5. Solid Waste Management: Remove solid wastes, including wood, generated from the LTF and dispose of it at an approved upland solid waste disposal site.

The contract will include provisions to ensure proper disposal of solid waste in accordance with NPDES and other permits. Disposal methods may vary with type of waste accumulated. Daily cleanup of the LTF is required when accumulations of bark and other wood debris are present.

C6. Bark Accumulation: Comply with permitting agency cleanup requirements (if any) if intertidal and submarine bark accumulations exceed standards (100% coverage exceeding one acre or an accumulation exceeding ten centimeters at any point).

To date, cleanup has not been required at existing LTF sites known to exceed these standards. There is still some question as to whether cleanup is feasible or even beneficial. Cleanup efforts will require cooperative efforts between the Forest Service and permitting agencies. If cleanup or remediation plans are developed, they would address alternative transfer devices and methods, operational practices, and removal of bark from the ocean bottom. Remediation plans would be approved by ADEC and permitting agencies.

C7. Bundle Speed: Control log bundle entry into receiving waters to the slowest speed practicable.

Log bundles will not be transferred to the water at this site.

Appendix D - LTF Site Selection, Design, and Marine Effects

C8. Surface Drainage Management: Use Best Management Practices to control surface water runoff from LTFs.

Sort yards have been located well away from LTFs to minimize bare ground adjacent to marine waters. Grade control, sediment detention ponds, cross-drains and site cleanup requirements will address erosion and sediment transport associated with surface water runoff.

C9. Control of Hydrocarbons: Utilize oil pollution prevention plans (BMP 12.8) and oil pollution contingency plans (BMP 12.9) to minimize petroleum products entering waters.

Petroleum product storage and equipment servicing and refueling will be controlled through specific contract provisions. Spill Prevention Control and Countermeasure plans provide organizational structure and procedures for responding to oil spills.

C10. Onshore Log Storage: Where feasible, give preference to onshore storage and barging of logs.

Onshore storage and barging of logs will be required at the Kuakan LTF site.

C11. Facility Maintenance and Reclamation: Maintain active and intermittent LTFs and restore abandoned LTFs.

The Kuakan LTF is considered intermittent and will be seeded upon completion of logging operations. Motorized access will be restricted within the Project Area; ramps and docks will not be provided in order to be consistent with road management objectives after the sale.

Monitoring and Reporting Guidelines

M1-6. Monitoring Requirements: Monitor for bark accumulations, oil sheen, surface runoff associated with LTF construction, operation and maintenance. Assure that corrective actions occur if necessary.

The LTF permits will specify monitoring requirements and methods. Typically, bark accumulation is monitored annually at the beginning of each operating season according to specific protocols by SCUBA surveys at active LTFs. Waters in the vicinity of the LTF are monitored daily for the presence of visible oil sheens during LTF operation.

M7. Report results of monitoring annually.

A summary of LTF monitoring results is available and reports are submitted annually to EPA and ADEC. LTF permits establish reporting procedures.

Figure D-2, Kuakan North LTF

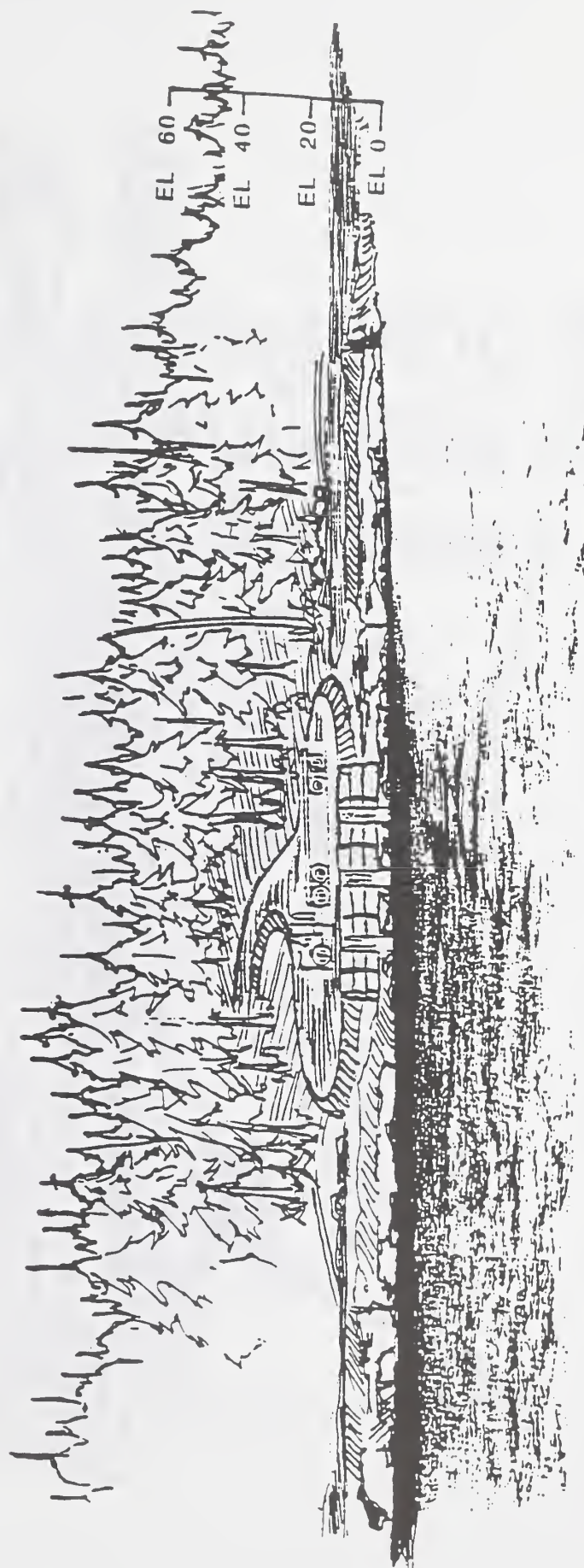
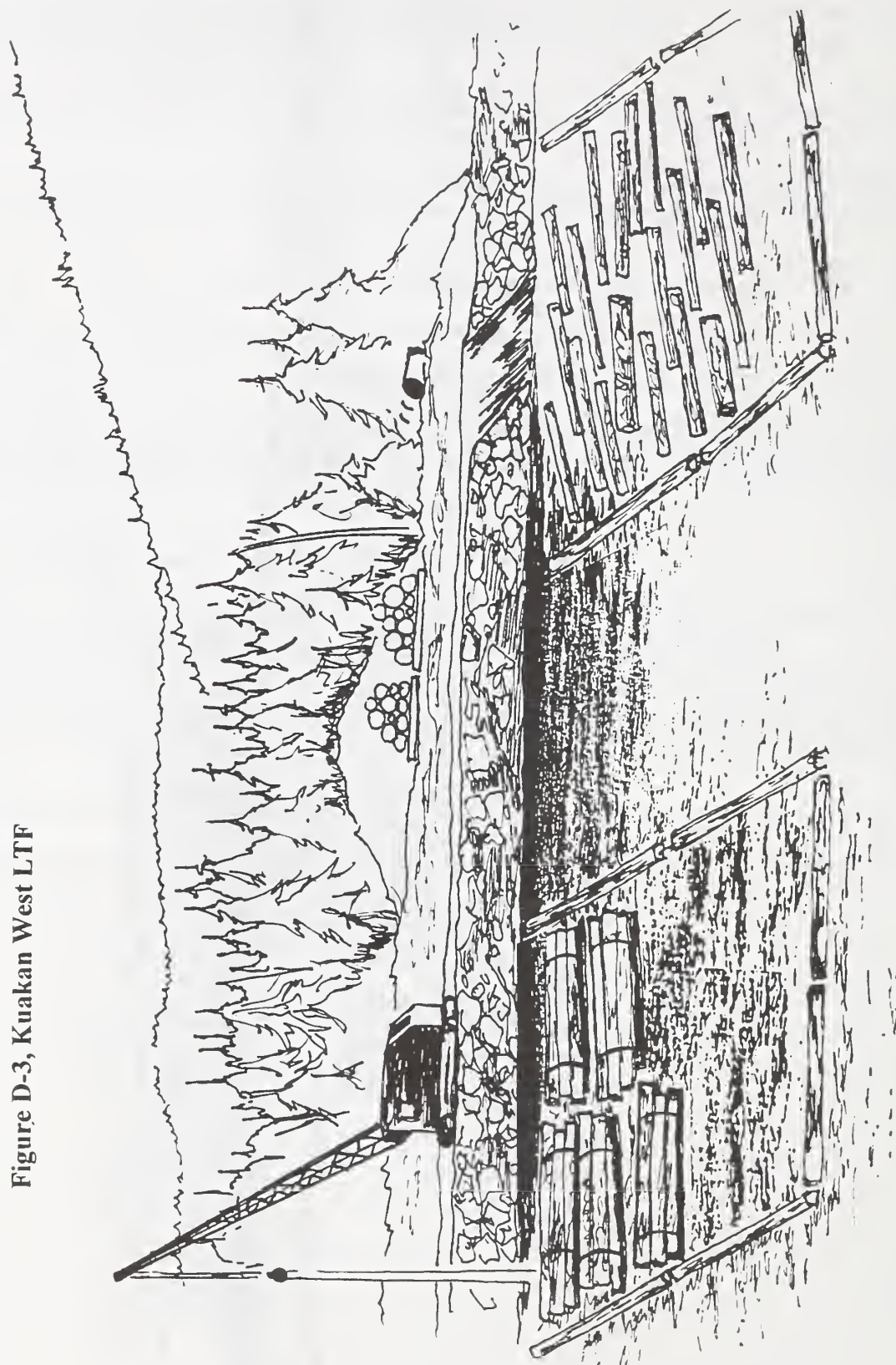


Figure D-3, Kuakan West LTF



Appendix E

Reasons for Scheduling the Environmental Analysis of the Kuakan Timber Sale Project

Appendix 3

Report of the
Committee on
the Study of
the



APPENDIX E

REASONS FOR SCHEDULING THE ENVIRONMENTAL ANALYSIS OF THE KUAKAN TIMBER SALE

This Appendix provides a detailed explanation of the rationale for a specific timber sale project and its importance to the multi-year timber program on the Tongass National Forest. To accomplish this, the following questions are answered:

- Why is Timber from the Tongass National Forest Being Offered for Sale?
- What Steps Must Be Completed to Prepare a Sale for Offer?
- How does the Forest Service Develop Expectations about the Market Demand for Timber?
- How does the Forest Service Maintain an Orderly and Predictable Timber Sale Program?
- How Does the Forest Service Decide Where Timber Sale Projects Should be Located?
- How Does This Project Fit into the Tongass Timber Program?
- Why Can't This Project Be Located Somewhere Else?

Coordinated timber sale planning is essential for meeting the goals of the Tongass Land Management Plan and to provide an orderly flow of timber to local industry. To determine the volume of timber to offer each year, the Forest Service can look to current market conditions and the level of industry operations. However, the lengthy planning process—of which this document is a part—requires the Forest Service to rely on projections of future harvest levels to decide how many timber sale projects to begin each year. This document explains how the Forest Service uses information about future markets and past experience with the logistics of timber sale planning to determine the volume of timber that needs to be started through this process each year. Using a detailed timber sale schedule that provides information about each sale as it moves through each stage of the planning process, this Appendix explains the rationale and the necessity for completing this particular timber sale project at this point in time.

Why is Timber from the Tongass National Forest Being Offered for Sale?

National Legislation

On a national level, the legislative record is very clear about the role of the timber program in the multiple-use mandate of the National Forests. The Organic Act of 1897, 16 USC 473-481 (partially repealed in 1976) directed the agency to manage the forests in order to "improve and protect the forest ... [and] for the purpose of securing favorable conditions of water flows, and to *furnish a continuous supply of timber* for the use and necessities of the citizens of the United States" (emphasis added.) The Multiple-Use Sustained Yield Act of 1960, 16 U.S.C. 528-531, directs the Forest Service to administer federal lands for "outdoor recreation, range, timber, watershed, and wildlife and fish purposes."

The National Forest Management Act of 1976 (16 U.S.C. 472a) states that "the Secretary of Agriculture...[may sell, at not less than appraised value, trees, portions of trees, or forest products located on National Forest System Lands." Although the heart of the Act is land management planning, the Act also sets policy direction for timber management and public participation in Forest Service decision making. Under NFMA, the Forest Service was directed to "limit the sale of timber from each national forest to a quantity equal to or less than a quantity which can be removed from such forest annually in perpetuity on a sustained-yield basis" (16 U.S.C. 1611)

The NFMA directed the Forest Service to complete land management plans for all units of the National Forest System. Forest Plans were to be developed by an interdisciplinary team to provide for the coordination of outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness. The 1979 Tongass National Forest Land and Resource Management Plan was the first to be completed. A revised

Appendix E – Reasons for Scheduling the Environmental Analysis

Forest Plan was issued in 1997. With regard to timber production, the Record of Decision for the 1997 Plan stated:

The Tongass National Forest will continue to allow timber harvest while maintaining sustained yield and multiple use goals...Although the maximum amount of timber that could be harvested during the first decade of the Revised Plan implementation is an average of 267 MMBF per year, a level of 200 MMBF or less is more likely to be offered over the next few years, given current market conditions and the transition that both the timber industry and the Forest Service is experiencing. Therefore the public can expect the amount of timber to be offered annually to vary between 200 MMBF or less and 267 MMBF.

...The timber resource will be managed for production of sawtimber and other wood products from timberlands available for sustainable timber harvest, on an even-flow, sustained-yield basis and in an economically efficient manner. We will seek to provide a timber supply sufficient to meet the annual market demand for Tongass National Forest timber and the market demand for the planning cycle...

In April 1999, Under Secretary Jim Lyons elected to modify the 1997 Plan and issue a new Record of Decision (ROD). As stated in the 1999 ROD:

The Tongass National Forest will continue timber harvest consistent with sustained yield and multiple use goals. The forest-wide standards and guidelines for timber include general direction to "[e]nsure that silvicultural systems other than clearcutting are considered through an appropriate project level analysis process. However, uneven-aged management systems will be limited to areas where yarding equipment suited to selective logging can be used"...

Forest-wide, considering all land allocations where timber harvest is permitted, it is estimated that 65 percent of harvesting will involve clearcutting, with the remaining 35 percent utilizing other methods.

...the ASQ for the next 10 years on the Tongass is reduced from an estimated average annual level of 267 MMBF in the 1997 ROD to 187 MMBF in the 1999 ROD, considering both NIC I and NIC II. Although initially this would seem to be a significant reduction in the ASQ, this ceiling for timber harvests from the Tongass remains sufficient to meet all but the most optimistic projections for timber demand and harvests from the Forest for the next decade. I believe that the additional environmental and multiple use benefits provided by this decision should not result in negative social and economic impacts based upon the most current demand for timber.

In day to day operation of the Tongass timber program, the Forest Service attempts to strike a balance among timber availability as documented in the Forest Plan, the market demand for timber in Southeast Alaska, the needs and desires of other forest users, and funding allocations made by Congress.

Alaska-Specific Legislation

Legislation unique to Alaska also directs the Forest Service to maintain a commercial timber program. The Alaska National Interest Lands Conservation Act (ANILCA; P.L. 96-487, 1980) and the Tongass Timber Reform Act (TTTRA; P.L. 101-625, 1990) speak directly to the issue of Tongass timber supply. Section 705(a) of ANILCA directed the Forest Service to maintain a timber supply from the Tongass at a rate of four billion five hundred million board feet per decade. To ensure that the timber target was met, Congress provided for a \$40 million annual earmark to fund pre-roading, cultural treatments and innovated logging systems.

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Section 101 of TTRA repealed the timber supply mandate and fixed appropriations of ANILCA and replaced them with the following more general direction:

Sec. 705. (a), Subject to appropriations, other applicable law, and the requirements of the National Forest Management Act (P.L. 94-588); except as provided in subsection 9d) of this section, the Secretary shall, to the extent consistent with providing for the multiple use and sustained yield of all renewable forest resources, seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest and (2) meets the annual market demand from such forest for each planning cycle.

Timber from the Tongass National Forest is being offered as part of the multiple use mission of the Forest Service as identified in public laws. Alaska-specific legislation and the Forest Plan directs the Forest Service to seek to provide timber to meet market demand subject to appropriations and balancing of forest uses.

What Steps Must Be Completed to Prepare a Sale for Offer?

The timber sale program is complex. A number of projects are underway at any given point in time, each of which may be in a different stage of planning and preparation. A system of checkpoints, or “gates”, helps the Forest Service track the significant milestones of each project from inception to contract termination, followed by monitoring, reforestation, and timber stand improvement. Each project passes through all of the following gates, with the complexity of the sale determining the complexity of the final product at each stage.

Gate 1: Completion of Position Statement. The Position Statement is a brief analysis of the project area with the intent of determining the feasibility of the potential timber sale. This is the first step in the timber sale planning process and it is usually completed from seven to ten years before a sale is offered. After the Position Statement is developed, the Forest Service decides whether to continue to the next phase of the project where a significant investment in time and money will be made.

Gate 2: Sale Area Design, Environmental Documentation and Decision. This phase of the project is commonly referred to as the “NEPA” phase and includes inventory, public scoping, analysis, draft disclosure of the effects of the project on the environment, public comment, final analysis and disclosure, decision, potential appeal, and litigation. Gate 2 activities are generally completed two to six years before a sale is offered. The end product of this phase, an environmental decision document, forms the starting point for the next phase.

Gate 3: Plan Implementation and Field Layout. Gate 3 activities are typically completed one to three years before a sale is offered. During this phase, the information and direction included in the decision document (Gate 2) is used to designate the actual project on the ground. Additional site-specific information is collected at this time.

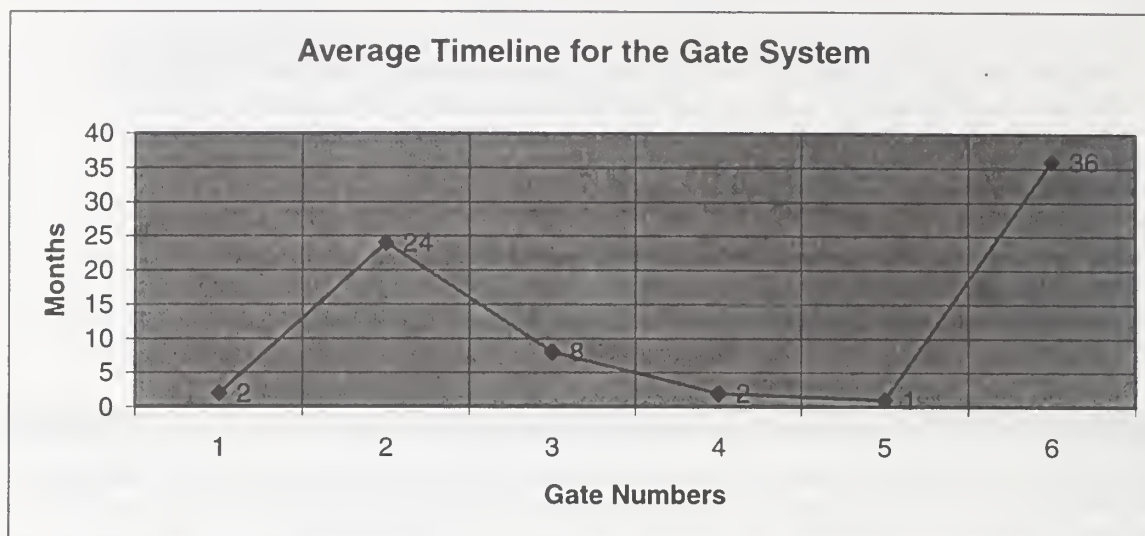
Gate 4: Appraisal Offering Package. The costs and value associated with the timber sale designed in Gate 3 are computed and packaged in a timber sale contract. The contract tells the prospective timber sale purchaser how the sale must be harvested to be in conformance to the project decision document. This phase of the Gate system occurs during the final year of the project development and culminates with the advertisement of the project for sale.

Gate 5: Bid Opening. Gate 5 is completed with the opening of bids for the project. If a bid is submitted, contractual provisions govern when the award of the sale takes place and when the sale will be completed and how timber removal is to occur.

Gate 6: Award. Gate 6 is the formal designation of a contract between a bidder and the Forest Service

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Figure 1.



How does the Forest Service Develop Expectations about Future Timber Markets?

The Tongass National Forest makes two determinations on volume to be offered. The first is a determination on volume to be offered for the current year (annual market demand). The annual market demand is analogous to assessing industry performance in the short-term. In the short-run a firm will make use of its existing equipment to maximize profits or minimize losses. The general approach is to consider the timber requirements of the region's sawmills at different levels of operation and under different assumptions about market conditions and technical processing capability. These assumptions provide a basis for estimating the volume of timber likely to be processed by the industry as a whole in any given year. Timber inventory requirements are acknowledged and estimated in a related calculation. The volume of timber likely to be purchased is equal to the volume needed to make up any inventory shortfall in addition to the volume likely to be harvested in the coming year. The document titled *Evaluating the Demand for Tongass Timber* (USDA, Forest Service, R-10; Morse; September 28, 1998) forms the basis for how these estimates are developed. The document titled *Tongass Timber Sale Procedures* (USDA, Forest Service, R-10; Morse, Draft August 30, 1999) documents actual estimates for the current year. This estimate is what the Tongass plans to offer for the current year of the Ten Year Timber Sale Schedule pending sufficient funding to do so.

Based on the analysis documented in *Tongass Timber Sale Procedures*, for Fiscal Year 2000, the Tongass National Forest plans to offer approximately 148 MMBF for sale. The sales planned for offer will be a combination of new, previously offered, or previously offered and reconfigured. Both standing timber and salvage will be components of the program. Offerings will consist of those targeted for Small Business qualified firms as well as a portion of the volume being made available for the open market.

Life of the Forest Plan (Market Demand over the Planning Cycle)

Given the long time involved in preparing a timber sale, the proposed timber sales in this document may not be harvested for 3 to 4 years or longer, not including appeals or litigation. The Forest Service needs some idea of what the long run timber demand will be given cycles in the market. On average what should the Forest Service plan for offer, given that timber from this NEPA document may not be harvested for 4 years into the future? The Forest Service needs to take a long-run view for planning purposes. To answer these questions the Forest Service asked the Pacific Northwest Research Station for professional assistance.

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As the Tongass Land Management Plan was being revised in 1997, research economists at the Pacific Northwest Research Station (PNW) were asked to update their earlier projections of Alaska timber products output and timber harvest by ownership. The most recent projections of timber harvest over the planning cycle account for several dramatic changes in the region's manufacturing capabilities, increased competition from a number of sources, and the steady erosion of North America's share of Japanese timber markets.

The Tongass documents these projections and the means of implementation through the issuance of a Ten Year Timber Sale Schedule. Each year this plan is updated whereby the current year is dropped at the culmination of the fiscal year and a new year ten is added. The basis for this schedule is long range timber market projections documented in the publication titled *Timber Products Output and Timber Harvest in Alaska: Projections for FY97-10* (Brooks and Haynes; PNW-GTR-409, September, 1997). These projections of Alaska timber products output, the derived demand for raw material, and timber harvest by owner are developed from a trend-based analysis. These projections reflect the consequences of recent changes in the Alaska forest sector and long-term trends in markets for Alaska products. With the closure of the two southeast Alaska pulp mills, demand for Alaska National Forest timber now depends on markets for sawn wood and the ability to export manufacturing residues and lower grade logs. Three alternative projections are used to display a range of possible future demand (Table 1). Areas of uncertainty include the prospect of continuing changes in markets and in conditions faced by competitors and the speed and magnitude in investment in manufacturing in Alaska.

Demand projections are important for program planning. They provide important guidance to the Forest Service for requesting budgets, for making decisions about workforce and facilities, and for indicating the need to begin new NEPA analysis for future program offerings. They also provide a basis for expectations regarding future harvest, and thus provide an important source of information for establishing the schedule of probable future sale offerings. The weight given to the projections will vary depending on a number of factors, such as how recently they were done, and how well they appear to have accounted for recent, site-specific events in the timber

Table 1-Projected National Forest Harvest

For Fiscal Year 2001-2009, the Tongass National Forest plans to schedule approximately 160 MMBF for sale each year over the life of the Forest Plan. This schedule is based on the projections documented in *Timber Products Output and Timber Harvest in Alaska: Projections for FY97-10* (Brooks and Haynes; PNW-GTR-409, September, 1997), and current volumes in the timber sale pipeline process. Prior to the beginning of Fiscal Year 2001 the amount of volume scheduled in outyears will once again be analyzed to determine if projections made now meet the anticipated needs in the future.

Fiscal Year	Projected Harvest (MMBF)		
	Low	Medium	High
2000	95.5	116.6	142.7
2001	104.6	129.0	157.7
2002	113.7	134.9	173.1
2003	122.8	140.8	188.9
2004	131.9	146.5	205.0
2005	131.9	152.2	221.4
2006	131.9	157.8	238.2
2007	132.0	163.4	255.3
2008	132.0	168.9	272.8
2009	132.1	174.3	290.7
Average	122.8	148.4	214.6
Mean	168.7		

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How does the Forest Service Maintain an Orderly and Predictable Timber Sale Program?

Pools of Timber (Pipeline Volume)

As discussed earlier, the Forest Service tracks accomplishment of various stages of development of each timber sale with the Gate System process. From a timber sale program standpoint, it is also necessary to track and manage multiple projects through time as projects collectively move through the Gate System. Tracking of the multiple projects can be likened to following various segments of several projects through a pipeline of time. Because of the relatively long timeframes needed to accomplish a given timber sale and the complexities inherent in timber sale project and program development, it is necessary to track various timber sale program volumes from Gate 1 through Gate 6. Gate 1 volume represents a large pool of program volume, but represents a relatively low investment from project to project. This relative investment level offers the timber program manager a higher degree of flexibility and thus, does not greatly influence the flow of volume through the pipeline. In addition, tracking of how much volume near the end of the pipeline that is in appeals or litigation may be necessary to determine potential effects on the flow of potential timber sales.

The goal of the Tongass National Forest is to provide an even flow of timber sale offerings on a sustained yield basis. In past years, this has been difficult to accomplish due to continual reductions in the suitable timber land base, reductions in the timber industry processing capabilities, rapid market fluctuations and Forest Plan modifications and litigation. To achieve an even flow of timber sale offerings, 'pools' of projects in various stages of the Gate System will be maintained so volume offered can be balanced against current year demand and market cycle projections. Today, upward trends in demand are reacted to by moving outyear timber projects forward leaving outyears not capable of meeting the needs of the industry. In other instances, a number of new projects are started based on today's market but not available for a number of years. By the time the added projects are ready for offer, the market and demand for this volume has changed. Three pools are being tracked to achieve an even flow of timber sale offerings:

1. Timber volume under analysis (Gate 2): Timber volume under analysis, contains sales being analyzed and undergoing public comment through the NEPA process. This process can often take from one to five years and reaches a significant milestone when a NEPA decision is made. This pool includes any project with a formal Notice of Intent through those with a decision document issued. Volume in appeals and litigation will be tracked as a subset of this pool as necessary.

2. Timber volume available for sale (Gate 3, Gate 4 and Gate 5): Timber volume available for sales, contains sales for which environmental analysis has been completed, and administrative appeals, and litigation (if any) have been resolved. They have also been fully prepared, and are available to managers to schedule for sale offerings. Managers need to maintain enough volume in this pool to be able to schedule future sale offerings in an orderly manner of the size and configuration that best meets the need of the public. As a matter of policy, and sound business practice, the Forest Service attempts to announce probable future sale offerings at least one year in advance. This allows potential purchasers an opportunity to do their own evaluations of these offerings in order to determine whether to bid, and if so, at what level.

3. Timber volume under contract (Gate 6): Timber volume under contract contains sales which have been sold and a contract awarded to a purchaser, but have not yet been fully harvested. Timber contracts typically, but not always, give the purchaser three years to harvest and remove the timber purchased. Long standing Forest Service practice is to attempt to maintain about two to three years of unharvested timber volume under contract to timber purchasers. This volume of timber is the industry's dependable timber supply which allows immediate flexibility in business decision. This practice is not limited to the Alaska Region, but is particularly pertinent to Alaska because of the nature of the land base. The relative absence of roads, the island geography, the steep terrain, and the consequent isolation of much of the timber land means that timber purchasers need longer-than-average lead times to plan operations, stage equipment, set up camps, and construct roads prior to beginning harvest.

Appendix E – Reasons for Scheduling the Environmental Analysis

What drives the various timber sale program pipeline pool volume is a combination of actual harvest and projected demand. As purchasers harvest timber, they deplete the volume under contract. Managers track harvest, and offer sales that give the industry as-a-whole the opportunity to replace this volume and build or maintain their working inventory. Although there can be significant variation for practical reasons from year to year, in the long-run, over both the high points and low points of the market cycle, timber harvest will equal timber sales.

The amount of pipeline volume in each of the pools is determined by the Forest Service based on historical patterns. Table 2-Pools Matrix displays what volume levels are expected to be maintained in each pool. Pool 1-Timber Volume Under Analysis is expected to be maintained at approximately 4.5 times the amount of anticipated harvest; Pool 2-Timber Volume Available for Sale is expected to be maintained at approximately 1.3 times the amount of anticipated harvest, and Pool 3-Volume Under Contract is expected to be maintained at approximately 3 times the amount of anticipated harvest. The objective of the pools concept is to maintain sufficient volume in preparation and under contract to be able to respond to yearly fluctuations in a timely manner.

Table 2- Pipeline Pool Matrix

Pipeline Pool Volume	Flows	Start of Year One	During Year One	End of Year One
1. Volume Under Analysis (Gate 2)		238	401	230
	NEPA Decision	126	343	171
2. Volume Available for Sale (Gate 3, Gate 4 and Gate 5)		79	266	159
	Offered		163	
	Sold		148	
3. Volume Under Contract (Gate 6)		325		352
	Volume Harvested*		121	
*Note-The amount of volume estimated to be harvested for the year sets the basis for what will be maintained in Pools 1-3 (Gates 2 through 6). Should this estimate be incorrect, adjustments can be made in the following years without significant departures in outyear programs capabilities.				

Matrix crosswalk between Gate Tracking System and Pools of Timber Concept:

Gate 2: Proposed timber volume with a published decision document (Record of Decision) that is viable for sale after completion of appeals and litigation.

Gate 3: NEPA cleared timber volume with field preparation work completed and the timber sale ready to be offered in a timber sale contract package.

Gate 6: Timber volume under contract.

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Table 2a- Volume in Appeals and Litigation

Timber volume in appeals and/or enjoined in litigation *.	55	Million Board Feet
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*As of September 30, 1999. The volume in appeals and or enjoined in litigation is updated on a quarterly basis.

How Does the Forest Service Decide Where Timber Sale Projects Should be Located?

The Allowable Sale Quantity (ASQ)

The Modified 1997 Forest Plan Record of Decision established an ASQ for timber at 1.87 billion board feet per decade which equates to an annual average of 187 million board feet (MMBF). The ASQ serves as an upper limit on the amount of timber that may be offered for sale as part of the regularly scheduled timber sale program. It consists of two separate Non-Interchangeable Components (NIC's) called NIC I, which is 1.53 billion board feet of timber per decade, and NIC II, which is .34 billion board feet per decade. The purposes of partitioning the ASQ into two components are to maintain the economic sustainability of the timber resource by preventing the over-harvest of the best operable ground, and to identify that portion of the timber supply that is at risk of attainment because of marginal economic conditions. The NIC I component includes lands that can be harvested with normal logging systems. The NIC II component includes land that has high logging costs due to isolation or special equipment requirements. Most of these NIC II lands are presently considered economically and technically marginal.

Immediately following the issuance of the Modified 1997 Forest Plan Record of Decision by the Deputy Under Secretary of Agriculture, James Lyons, the Forest Service began an analysis of the ROD to develop consistent methodologies for its implementation (Implementation of Tongass Land Management Plan, 1920/1950, James A. Bartelme, Forest Supervisor, May 11, 1999). The purpose of the analysis was to develop methodology to ensure the modified Forest Plan changes received a consistent implementation approach across the Tongass, and to determine where the land base existed to begin programming current and future timber sale projects.

The Tongass National Forest has been unified under one Forest Supervisor overseeing the three combined Administrative Areas (Chatham, Stikine and Ketchikan). The allowable sale quantity is disaggregated by Ranger District offices for planning and scheduling purposes. Each District has been allocated a portion of the timber harvest program based on the FORPLAN computer run and availability of suitable and available acres, to implement the Forest Plan, and Section 101 of the Tongass Timber Reform Act (1990). The Forest Plan set the Forest allowable sale quantity (ASQ) upper limit at 187 MMBF per year. The distribution of the planned ASQ harvest among the Districts is listed in Table 3 (All volumes are identified as sawlog plus utility):

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Table 3-Distribution of ASQ Among the Tongass National Forest Ranger Districts

Historically, timber harvest activities were generally concentrated in the central and southern portions of the Tongass. Now, under the Modified 1997 Forest Plan, the suitable timber land base is more evenly distributed across the Forest. As a result, it is necessary to lessen harvest on the southern end and begin planning projects in areas further north. In answer to the question presented for this section of the Appendix, the suitable timber base is capable of producing the ASQ documented in the Modified 1997 Forest Plan Record of Decision. However, harvest activities will be more evenly distributed than they were in the past.

Tongass NF Ranger District	Non-Interchangeable Components	
	NIC I	NIC II
Ketchikan	18	4
Thorne Bay	21	5
Craig	18	4
Wrangell	24	4
Petersburg	37	8
Sitka	12	3
Hoonah	6	2
Juneau	12	3
Yakutat	5	1
Admiralty	0	0
NIC Totals	153	34
ASQ Total	187	

Chart 1- 1997 Modified Forest Plan Land Allocations

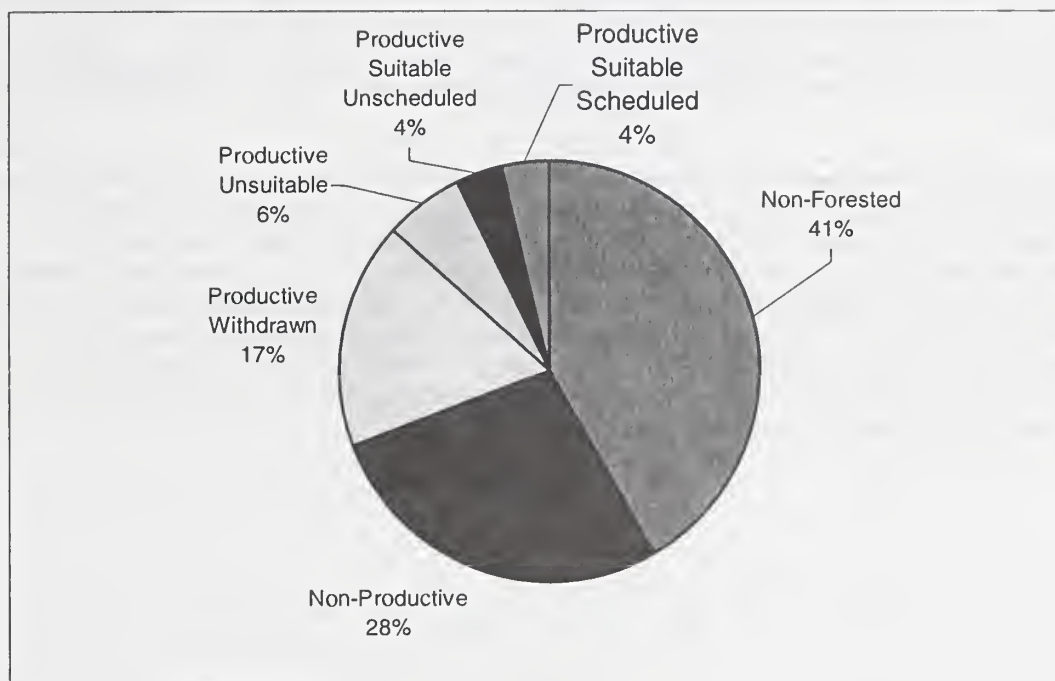


Chart 1- 1997 Modified Forest Plan Land Allocations depicts the productive suitable land base that is scheduled for timber harvest activities. Four percent of the Tongass land base generates the allowable sale quantity of 187 MMBF per year. The remainder of the land, approximately ninety-six percent, does not allow or will not support timber harvest activities.

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District-Level Planning

The Forest Supervisor for the Tongass National Forest has discrete responsibilities for the overall management of the Forest's timber sale program. Included within these responsibilities is making the determination on the amount of timber volume to be made available to the industry as described above. Once a determination is made for the current year (annual demand) offer level, the information is presented to Congress via the Regional Forester and Chief of the Forest Service. Whether or not funding is appropriated to attain the program is the responsibility of the Congress and the President of the United States.

While the debate on funding takes place, the Tongass Forest Supervisor directs the District Rangers to formulate timber sale schedules that attain the prescribed offer level for the current year as well as develop outyear timber programs based on projected market demand for the planning cycle. It is the Ranger's role to recommend to the Forest Supervisor timber sale projects that meet forest plan goals and objectives. Districts work on various projects simultaneously resulting in continual movement of projects through the stages of the timber program pipeline. Their schedule allows the necessary time to complete preliminary analysis, resource inventories, environmental documentation, field layout preparations and permit acquisition, appraisal of timber resource values, advertisement of sale characteristics for potential bidders, bid opening, and physical award of the timber sale. Once all of the Rangers' recommendations are made and compiled into a consolidated schedule, the Forest Supervisor is responsible for the review and approval of the final plan.

Pending Congressional appropriations, the sale schedule is implemented. In the event insufficient funds are appropriated to achieve the desired outputs, timber sale projects are selected and implemented on a priority basis. Generally, the higher priority projects include sales where investments such as, road networks, camps or log transfer facilities have already been established. Those sales that are not implemented or only partially implemented are moved to the outyears. The sale schedule becomes very dynamic in nature due to the number of influences on each of the districts. A formal review of the schedule is done annually by the Forest Supervisor in consultation with the District Rangers, and amendments are made as needed through the course of the year. (The Tongass Timber Sale Plan is located on the Tongass National Forest Website)

The National Forest Management Act requires the Forest Service to develop timber sale schedules that encompass the life of the forest plan. The recent Tongass National Forest planning process culminated upon issuance of the Modified 1997 Forest Plan Record of Decision for the Tongass Land and Resource Management Plan. In response to this Plan, the Tongass has prepared a Ten Year Timber Sale Schedule for Fiscal Years 2000-2009. Fiscal Year 2000 offer level is based on annual market demand estimates. The remaining years, 2001-2009 are based on market demand projections over the planning cycle. Table 4-Tongass Ten Year Timber Sale Schedule-Fiscal Year 2000, denotes the first year of the ten-year plan. Fiscal Year 2000 is listed below to show the reader an example of the information available and display the timber sales scheduled for the current fiscal year.

Appendix E – Reasons for Scheduling the Environmental Analysis

Table 4-Tongass Ten Year Timber Sale Schedule-Fiscal Year 2000

			S+U	Sale	Vol S+U	Class	FY00		
							Gate	Gate	Gate
Project	Date	RD	(MMBF)	Name	(MMBF)			3	5
Sea Level EIS	May-99	KRD		Madder	26	S			26
Sea Level EIS	x	KRD		Buckdance	11	S			11
Sea Level EIS	x	KRD		Orion	13	S			13
Craig Small Sales EA	x	CRD	1.5	Craig Small Sales	1.5	S	1.5	1.5	1.5
TNB Small Sales EA	x	TNB	5	Various	5	S	5	5	5
Luck Lake EIS	Jan-00	TNB	13	Luck Lake	5	S	13	5	5
Luck Lake EIS	x	TNB		Twin Bridge	8	S		8	8
Couverdan CE	Jun-00	JRD	0.8	Couverden Salvage	0.8	S	0.8	0.8	0.8
8-FATHOM EIS	Apr-96	HRD		Midway	6.4	S		6.4	6.4
HRD Small Sales EA	x	HRD	0.2	Small sales	0.2	S	0.2	0.2	0.2
NW BARANOF EIS	Feb-96	SRD		Schultz	8	S		1	8
Small Salvage Sale CE	x	YRD	0.2	Small Salvage Sale-00	0.2	S	0.2	0.2	0.2
Woodpecker EIS	(May-00)	PRD	(5-18)	Woodwork	1	S	18	1	1
Twin Creek EA	Aug-98	PRD		Twin Creek heli (41,66)	1.5	S		1.5	1.5
Twin Creek EA	Aug-98	PRD		Twin Creek 15	0.1	S		0.1	0.1
South Lindenberg EIS	Dec-96	PRD		South Central (U140)	1.5	S		1.5	1.5
South Lindenberg EIS	Dec-96	PRD		S.Lindy SE	10	S		10	10
East Fork EA	Jul-88	PRD		East Fork	2	S		2	2
Bohemia Mountain EIS	Jun-95	PRD		Goose (Unit 538)	1	S		1	1
Doughnut EA	x	WRD	8	Doughnut	4	O	8	4	4
Skipping Cow EIS (X)	x	WRD	20	Skipping Cow	20	S	20	20	20
Kuakan EIS	x	WRD	12	Kuakan	12	S	12	12	12
Total			40		138.2		40	81.2	138.2

NOTE: The difference between projected volume (148 MMBF) and offer volume (138 MMBF) will be made up from re-offer/reconfigured unsold FY 98/99 timber sales.

Appendix E – Reasons for Scheduling the Environmental Analysis

The Ten Year Schedule provides a significant amount of information and is described as follows:

Title	Description
NEPA Project	Environmental document project name. This name may or may not differ from the timber sale project name depending on how many sales originate from the original NEPA document.
Decision Date	The date of the decision document whether planned or actual. 'x' denotes project has started and completion is within the FY noted under column H.
RD	Ranger district office project is located (PRD=Petersburg Ranger District).
S+U (MMBF)	Anticipated timber volume (sawlog plus utility) expected from the NEPA document. Generally only appears once in the year the decision is made. If no volume shown, decision on document was made in another fiscal year.
Sale Name	Timber sale project name.
Vol S+U (MMBF)	Timber sale project volume (sawlog plus utility).
Class	Timber sale size class determination (S-SBA, O=open sale to all bidders).
FY00 Gate 2 (NEPA)	Only appears in the year the NEPA document will be decided. Number designates potential volume.
FY00 Gate 3 (Layout)	Only appears in fiscal year sale is to be laid out and appraised. May appear in more than one year.
FY00 Gate 5 (Offer)	Only appears in fiscal year sale is to be offered. Number designates potential volume.

The location of timber sale projects are based on the land allocation directed in the Forest Plan decision. Timber sales are located where permitted based on the prescription and objectives of the land use designation. Timber sale projects are located to varying degrees in land use designations identified as timber production, modified landscape, and scenic viewshed.

As stated earlier, the District Ranger is responsible for identifying and recommending the project areas for the Ten Year Timber Sale Schedule. The considerations the Ranger makes on each project includes but are not limited to the following:

1. The project area contains a sufficient number of acres allocated to development land use designations to make timber harvest in the area appropriate under the Forest Plan. There is an adequate amount of suitable and available land for timber harvest opportunities. Available information indicates harvest of the amount of timber volume being considered for this project can occur consistent with the Forest Plan standards and guidelines and other resource protection requirements.
2. The project and proposed timber harvest volume can contribute to achieving the goals and objectives of implementing the Forest Plan.
3. The potential investment in infrastructure (roads, bridges, log transfer facilities, camps, rock pits, etc.) is necessary for sustainable timber harvest offerings. Where infrastructure already exists, this project will enable maintenance and upgrade of the facilities, which is necessary for removal of timber volume.
4. The potential effects on subsistence and other resources.
5. Based on current year and anticipated outyear timber volume demand; volume currently under contract; anticipated Congressional allocations; and the availability of resources to fully prepare and offer this project for sale, this project is consistent and meets Forest Service Policy in the

Appendix E – Reasons for Scheduling the Environmental Analysis

Alaska Region, Regional Guide; Best Management Practices; the Modified 1997 Tongass Land and Resource Management Plan; and all other laws and regulations governing the removal of timber from National Forest System Lands.

How Does This Project Fit into the Tongass Timber Program?

The Kuakan Timber Sale Project is scheduled for offer in Fiscal Year 2000 (Tongass National Forest Ten Year Timber Sale Schedule, approved by Thomas Puchlerz, Forest Supervisor, dated 10/28/1999). Forest-wide, total offer volume being planned for Fiscal Year 2000 is 168 MMBF. In order to achieve the planned offer date, the Kuakan Timber Sale Project has a scheduled Gate 2 completion date of Fiscal Year 2000 with Gate 3 implementation to begin in Fiscal Year 2000.

The Kuakan Project is currently in Gate 2, "Volume Under Analysis". The project's action alternatives being addressed in the NEPA analysis range from 10.3 MMBF to 15.6 MMBF that could contribute to the Tongass Timber Sale Program. As described earlier, the volume of timber needed to maintain this pool is 343 MMBF. Potential selection of an action alternative for this project would bring the volume in the NEPA decision pool between 160.1 MMBF to 165.4 MMBF. Therefore, the Kuakan Project is consistent with program planning objectives and necessary to meet the goal of providing an orderly flow of timber from the Tongass on a sustained yield basis. Given the included information, it is reasonable to be conducting the environmental analysis for this project at this time.

Why Can't This Project Occur Somewhere Else?

As previously discussed, the market demand for timber for the next ten years is expected to average 160 MMBF per year. The suitable and available land base on the Tongass is capable of supporting an Allowable Sale Quantity of 187 MMBF annually, 153 MMBF of which is considered economical (i.e. the NIC I component). Based on the projected market demand for the planning cycle, all suitable timberlands will eventually be scheduled for harvest to meet the current and projected demand for raw material in Southeast Alaska. The cumulative impact on other resources from past harvest activities, the location of timber sales under contract, and the eventual use of all suitable lands for timber sale projects makes the relocation of this project in another area inefficient and potentially contrary to the standards and guidelines of the Forest Plan.

- Areas with available timber will be necessary to consider for harvest in order to seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest and (2) meets the market demand from such forest for each planning cycle, pursuant to Section 101 of the Tongass Timber Reform Act (TTRA).
- The potential effects on subsistence resources are projected to differ little based on the sequence these areas are harvested. Harvesting other areas with available timber on the Tongass National Forest is expected to have similar potential effects on resources, including those used for subsistence, because of widespread distribution of subsistence use and other factors. Harvest within other areas is foreseeable, in any case over the forest planning horizon under the Forest Plan.
- Providing substantially less timber volume than required to meet Forest Plan and TTRA Section 101 timber supply and employment objectives in order to avoid harvest in the project area is not necessary or reasonable.
- It is reasonable to schedule harvest in the project area rather than in other areas at the present time based on previous harvest entry and access, level of controversy over subsistence and other effects, the ability to complete the National Environmental Policy Act (NEPA) process and make timber available to meet the needs of dependent industries. Other areas that are reasonable to consider for harvest in the near future are the subject of other project EIS's that are currently ongoing or scheduled to begin soon.

Appendix F

Island Analysis

Consideration of Timber Management on Deer Island

А. С. ПЕТРОВ

С. 123-124

Appendix F

Island Analysis

Consideration of Timber Management On Deer Island

An island-wide timber management schedule was developed that incorporated wildlife habitat and scenery management objectives to derive the range of volume to harvest at this time. Because Deer Island lends itself to helicopter harvest, the need to harvest timber at any particular time to pay for infrastructure development was not considered. We decided two management scenarios, one where timber would be harvested with few entries, each taking approximately 1/4 to 1/3 of the available timber, and another where timber would be harvested with more frequent entries, each taking approximately 1/6 to 1/5 of the available timber would be feasible.

In general, more frequent entries, impacting fewer acres is more desirable for both scenic resources and wildlife compared to fewer entries impacting more acres each time. Harvest economics are optimized with larger sales and fewer "start up"/"shut down" periods.

To determine the amount of timber to harvest at this time, the island was delineated into six landscape blocks based on physical characteristics. We determined a harvest level range for each landscape block using a variety of rotation ages based on specific resource concerns and stand conditions. Primary considerations in determining the harvest level was past timber harvest, logging system (cable vs. helicopter), visual sensitivity or visual absorption capacity and gross natural disturbance regimes. Each entry had to have enough timber to make an economical sale offering.

Land Units Descriptions

- | | |
|------------------|---|
| Islands | All in Semi-Primitive (Remote) Recreation, a non-development LUD. 45 acres within this landunit, on Cucumber Island, were harvested in 1989. There are 1,238 acres in this landunit. None of these acres are considered suitable for timber harvest due to the non-development Forest Plan Prescription for islands smaller than 1000 acres. |
| South Tip | This area is characterized by relatively flat lowlands, mostly screened or unseen below the 300' contour. About 50% of the landunit is in the beach buffer. 141 acres are in second growth from the 1989 harvest, with 112 of those acres in the current beach fringe. 36 acres are classified as MMHAZ 4. Mixed muskeg forested wetlands and old growth are the dominant vegetation types. Wind disturbance is most abundant in the beach fringe stands, and further inland timber is scrubby and cedar is a dominant component. Due to natural disturbance, manage on a 100 year rotation. Address restoration of stands in the beach buffer. There are 681 acres in this landunit. 75 acres are considered suitable and available for timber harvest at this time. |

Appendix F - Island Analysis

Alternatives: Small, or no entry this time.

West Side

This area is characterized by broken topography, and contains about 900 acres of MMHaz 4 soils, more than any other land unit. It is steep, cliffy country with benches, high elevation brush slopes, visible land slides, some wind disturbance areas, some better drained highly productive soils, several short coastal reaches of fish habitat and two short anadromous streams (Bear Creek is 0.7 miles long and Lazy Creek is 0.2 miles long). Topography limits unit size. Beach fringe is generally more gentle with oversteepened slopes located mid slope and above. This block contains the majority of the TLMP OGR. Existing managed stands - 102 acres outside beach fringe - 136 acres within beach fringe, including 9 acres harvested in the 1930's. Due to natural disturbance, manage on a 100 year rotation.

Alternatives: frequent small entries (10% every 10-15 years) or fewer larger entries (25%, then let it rest for 30 years).

East Side

This area is uneven and broken in the northern 2/3, and more uniform with low Visual Absorption Capability (VAC) in the southern 1/3. There has not been much large scale wind disturbance. The vegetation is mostly old-growth hemlock, with a large component of cedar in the southern 1/3 of the landunit. The beach fringe is generally steep, with gentler slopes and benches (where the potential road is located) midslope. The beach fringe has numerous scattered stumps from hand-logging at the turn of the century. The VQO is modification. This block contains the main road corridor for Deer Island, if a road were to be built. The road location traverses a steep slope (the switchbacks) in the northern 1/3 of the block. One 36 acre managed stand is located in the southern portion of the landunit, with 13 acres outside the beach fringe, and 23 acres within the beach fringe.

Alternatives: 150-200 year rotation - no road, with harvest up to 30% scattered over the area, or build most of road now and harvest 30% to pay for the bulk of road, or build a short segment of road now and harvest up to 20% of the available timber.

Loon Lake

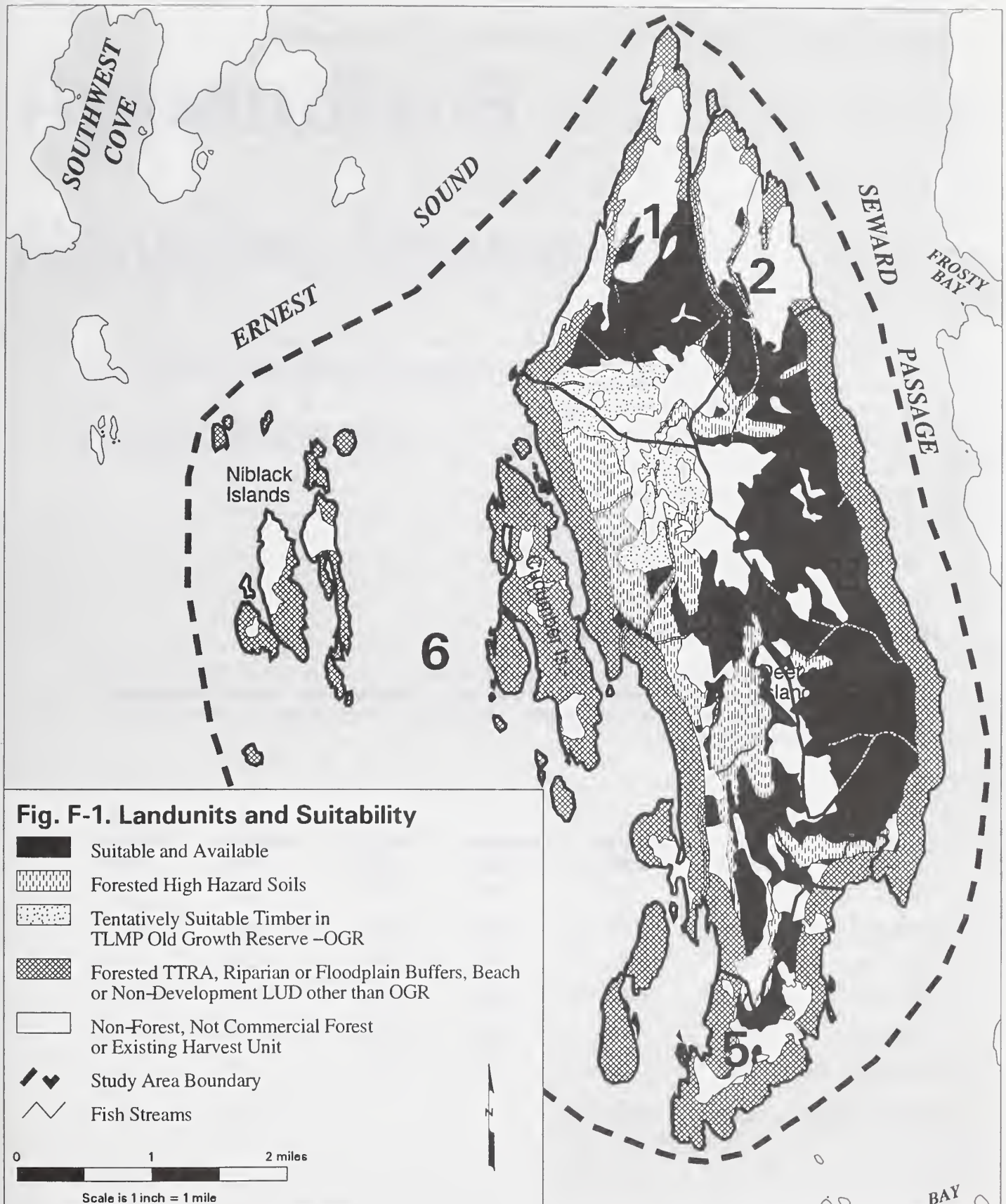
This area is primarily bedrock controlled lowlands. Much of the vegetation is forested wetlands with mostly organic soils, scrub cedar, muskeg and salal. This block contains the site of the proposed LTF and mainline road, if a roaded alternative is selected. Active goshawk nests have been located during each of the last three years (1997-1999), all within 1 mile of each other, indicating that the same pair is using the area annually. A wolf den was also located in this area. There is one anadromous fish streams in this block, referred to as Canyon Creek (1.1 miles of anadromous habitat). Much of the suitable ground is gentle enough for cable yarding. Locate the potential road as far from known goshawk nest sites and wolf den as possible. Manage on a 150 year rotation.

Alternatives - Move the OGR to this location, or harvest 10% this entry, spread out in small entries over time, or harvest 25% this entry and not enter again for a longer time period. The biologists recommended OGR would include almost all of the Loon Lake Landunit.

Northwest

This area is forested wetland heavy to cedar. There is one small resident fish stream (Foam Creek, 0.4 miles) on the northwest side which serves as a travel corridor from the beach fringe to the higher uplands. The area is broken with large rock outcrops and not easily roadable, with the exception of the eastern edge. Overall it has the appearance of a gentle uniform slope and therefore has relatively low VAC. Mostly medium to low timstrata. There is a 5 acre 1989 harvest unit in the beach fringe near the extreme north tip of Deer Island. Manage on 150 year rotation.

Alternatives - harvest 25% on the initial entry, then stay out for an extended period.



Appendix F - Island Analysis

% Suitable for harvest by land unit by decade, based on assumptions of 100 to 200 year rotations.

Rotation Year	100 yr South	100 yr South	150 yr East	150 yr East	200 yr East	100 yr West	100 yr West	150 yr Loon	150 yr Loon	150 yr North	none Islands
1989	5	5	2	2	2	5	5	0	0	0	
2000	0	10	20	30	20	10	25	10	25	25	0
2010	10	10				10					
2020	10	10	20		10	15	25	10		20	
2030	10										
2040	10	30	20		10	30	25	15	25	20	
2050	10			35							
2060	10	35	15		10	30	20	15		20	
2070	10										
2080	10		15		10			15	25		
2090	10										
2100	5			35	10			15		15	
2110			10								
2120					10				25		
2130								20			
2140					10						
2150											
2160					10						

Acreage suitable for harvest this entry

From the two different styles of management based on the frequency of entry and the amount of harvest each entry, we derived the following acreage to consider for harvest this entry. "Infrequent entry" represent a management approach with larger entries spaced out further in time. The "Frequent entry" represents the lighter but more frequent harvest management scenario.

Land Unit	Total Acres	Suitable Acres	% Infrequent entry	% Frequent entry	Acres Infrequent entry	Acres Frequent entry
Islands	1238	0	0%	0%	0	0
Northwest	1407	432	25%	25%	108	108
Loon Lake	687	92	25%	10%	23	9
East Side	2566	1480	30%	20%	444	296
West Side	2976	609	25%	10%	152	61
South Tip	681	75	10%	0%	8	0
TOTAL ACRES	9555	2688			735	474

Appendix G

Mitigation Measures

Site-specific Mitigation Measures

Mitigation Measures Matrix



Appendix G

Mitigation Measures

The site-specific mitigation measures that are applied to selected units and/or roads in the Kuakan project are identified in this section. The source(s) of each mitigation measure are listed after the measure in terms of individual Forest-wide Standards and Guidelines (see Chapter 4 of the Forest Plan) or BMPs (see Appendix C of the Forest Plan and Chapter 10 of FSH 2509.22, The Soil and Water Conservation Handbook). This list is not an all-inclusive list of mitigation measures for the Tongass, but is a list of the measures that apply specifically to the Kuakan project. The mitigation measures are grouped by resources. Each measure is preceded by a reference letter and number. The unit cards and road cards in Appendices A and B include the reference codes of mitigation measures that apply to each unit or road. The table following this list displays a summary of the mitigation measures by unit and alternative for the Kuakan project.

FISH, WATER, & SOILS

- F1 Riparian Buffers:** Establish no-harvest buffers along Class I, Class II, and Class III streams to protect riparian areas as defined by the Forest Plan Riparian Standards and Guidelines. Provide reasonable assurance of windfirmness through unit design measures. Protect buffers from adjacent harvest activities (e.g., directional felling, split yarding, suspension requirements). Consult fisheries specialist as needed. (RIP2, BMP 12.6, 12.6a, 13.16)

Units 1, 2, 2D, 5, 12, 12A, 12D, 13, 13A, 13B, 14, 16, 18, 24, 25, 30, 31, 33, 34, 35, 36

- F2 Class IV Stream Protection:** Fell trees away from streams and split yard or provide full suspension over Class IV streams where feasible. Partial suspension is allowed across small Class IV streams. Remove logging slash from streams as necessary. Consult fisheries specialist as needed. (RIP2-II, BMP 13.16)

Units 2, 2A, 2D, 3, 4, 4A, 7, 7A, 7B, 7C, 8, 9, 10, 10A, 11, 11A, 12, 12A, 12C, 12D, 13, 13A, 13B, 18, 19A, 19B, 21, 25, 29, 30, 31, 32, 33, 34, 35, 36, 37

- F3 Harvesting Timber in Wetlands:** No roads will be constructed. Minimize felling cull trees that will not be yarded. (BMP 12.5)

Units 2, 2D, 31

- F4 Harvesting on Steep or Unstable Soils:** Avoid harvest on slopes greater than 72%. Use helicopter and tree retention as described. Consult soils specialist as needed. ((S&W112-I, BMP13.5, 13.9)

Units 1, 3, 7, 7B, 7C, 11A, 12A, 15, 17, 17A, 18, 18A, 19A, 19B, 20, 20A, 24, 29, 30, 33, 34, 35, 36, 37

- F5 Suspension Requirements to Protect Soils:** Use partial- to full-suspension logging systems in areas with high mass movement potential or McGilvery soils. (S&W112-I, BMP 13.9)

Units 1, 3, 5, 7, 7B, 7C, 11, 12A, 13A, 13B

Appendix G - Mitigation

- F6 Fish Passage:** Maintain fish passage at Class II stream road crossings where feasible, using properly designed stream crossing structures (consult the Aquatic Habitat Management Handbook, FSH 2609.24). (FISH112-IV)
- Road 6700, crossing A
- F7 Road-Stream Crossings:** Locate stream crossings in stable reaches, use minimal fill and remove structure after use. (TRANS214-II)
- Road 6701, crossings A, B and C
- F8 Road Construction through Wetlands:** Roads avoid wetlands where feasible. Some segments of roads cross mixed conifer wetlands with the objective of minimizing impacts to peatland. (TRAN214-III)
- Roads 6700 and 6701
- F9 Erosion Control:** An erosion control plan for road construction and maintenance will be developed. All areas of organic or mineral soil exposed during construction will be revegetated using native species. (BMP 14.5, 12.17)
- Roads 6700 and 6701
- F10 Road Storage:** Remove or bypass all drainage structures to restore natural drainage patterns. Add waterbars as needed to control runoff and block access by motor vehicles. (TRAN22-I)
- Road 6701 (all) and Road 6700 (beyond mile post 2.0)
- F11 Road Construction on Steep or Unstable Slopes:** Where avoidance of road construction along unstable slopes is not possible, take special precautions with fill to prevent soil erosion, stream sedimentation, and mass wasting or require full bench construction and end hauling of excavated material. (S&W112-I, TRAN 214-II, and BMP 14.7)
- Roads 6700 and 6701

WILDLIFE & THREATENED/ENDANGERED/SENSITIVE SPECIES

- W1 Clearcutting with Reserves:** Provide for greater habitat diversity on a stand level over time by using clearcutting with reserve trees (even-aged system) as a harvest prescription (see Appendix G to Forest Plan FEIS). (WILD112 - III)
- Units 3, 4, 5, 7, 7A, 8, 10, 11, 12A, 12D, 13A, 14
- W2 Reserves Under a Two-aged Harvest System:** Provide for greater habitat diversity on a stand level over time by leaving reserve trees (two-aged system) as a harvest prescription (see Appendix G to Forest Plan FEIS). (WILD112 - III)
- Units 3, 4A, 7C, 8, 9, 10, 12, 12A, 12C, 13, 13B, 14, 15, 16, 17, 17A, 18, 20, 20A, 21, 29, 30
- W3 Patch or Strip Clearcutting:** Provide for greater habitat diversity on a stand level over time by using patch or strip clearcutting (two-aged or uneven-aged systems) as a harvest prescription (see Appendix G to Forest Plan FEIS). (WILD112-III)
- Units 2, 7B, 10A, 15, 18A, 19A, 19B, 24, 25, 28

Appendix G - Mitigation

- W4 Selection Harvest:** Provide for greater habitat diversity on a stand level over time by using the selection method (uneven-aged system) as a harvest prescription (see Appendix G to Forest Plan FEIS). (WILD112 - III)
- Units 1, 11, 11A, 12, 31, 32, 33, 34, 35, 36, 37
- W5 Leaving Nonmerchantable Trees and Snags:** Provide for greater habitat diversity on a stand level over time by leaving most nonmerchantable trees and snags after harvest. (WILD112 - III)
- Applies to all units where feasible
- W6 Restrictions on Helicopter Yarding:** Modify helicopter yarding routes and/or timing of helicopter activity to avoid important wildlife habitats (sea-lion haulout at Point Peters, known goshawk nests, or active eagle nest sites). (WILD112-XII)
- Units 1, 2, 2A, 2D, 11, 11A, 12, 12A, 13, 13A, 14, 15, 16, 17, 17A, 19A, 19B, 20, 20A, 21, 28, 29, 30, 31, 34, 35, 36, 37
- W7 Road Closures:** Close roads to motorized use to protect brown bears, wolves, marten and other large predators and furbearers from over harvest. (WILD112)
- Roads 6700 and 6701
- W8 Protection of Goshawk Nests:** Avoid harvest and road construction near confirmed and probable northern goshawk nest sites according to Forest-wide Standard & Guideline TE&S-II,J,I. (TE&S-II)
- Units 4, 4A, 5, 7, and other sites if new nests are located.
Road 6700
- W9 Timing of Activities and Disturbance at Goshawk Nests:** Avoid continuous disturbance within 600 feet of an active goshawk nest from March 15 to August 15 (TE&S-II).
- Units 1, 4, 4A, 5, 7
Roads 6700 and 6701
- W10 Protection of Bald Eagle Nest Trees/Other Sites and Timing of Activities:** Avoid all activity, modify unit or road design, and/or limit timing of activities, near bald eagle nest trees, perch trees, and winter roost sites in accordance with the Interagency Agreement established with the U.S. Fish and Wildlife Service. (WILD112-V)
- All units, especially note units 2, 2A, 2D, 11, 11A, 12, 12A, 13, 13A, 14, 15, 16, 17, 17A, 19A, 19B, 20, 20A, 21, 28, 29, 30, 31, 34, 35, 36, 37
- W11 Timing of Activities and Disturbance of Nesting Murrelets:** Minimize disturbance activities within 600 feet of marbled murrelet nests during the nesting season (May 1 - August 15). (WILD112-XII)
- No known nests, will affect any units where nests are located.
- W12 Protection of Heron Rookeries and Raptor Nests:** Protect active heron rookeries and raptor nests (bald eagle, northern goshawk and osprey are covered by other measures) by providing 600-foot windfirm buffers, where available. (WILD112-X)
- No known nests, will affect any units where nests are located.

Appendix G - Mitigation

- W13 Timing of Activities and Disturbance of Herons and Raptors during Nesting:** Minimize disturbance of heron rookeries and raptor nests, by restricting development activities to periods outside the active nesting season (generally March 1 to July 31). (WILD112-X)

No known nests, will affect any units where nests are located.

- W14 Protection of Wolf Dens:** Maintain a 1,200-foot forested buffer, where available, around known active wolf dens. (WILD112-XI)

Road 6700

- W15 Timing of Activities and Disturbance of Denning Wolves:** Avoid road construction within 600 feet of known active wolf dens. (WILD112-XI)

Road 6700

- W16 Management of Marten Habitat:** Maintain important features of forest stand structure in harvest units in order to manage high value marten habitat according to Forest-wide Standard & Guideline WILD112-XVI,A,2. (this applies to VCU in higher risk biogeographic provinces). (WILD112-XVI)

Units 1, 3, 8, 10, 10A, 11, 11A, 12, 12A, 12C, 12D, 13, 13A, 13B, 14, 15, 17A, 28, 32, 33, 34, 35, 36, 37

RECREATION AND TOURISM

- R1 Access Restrictions for Recreation:** Close or restrict access on roads to maintain remoteness of areas after harvest (REC112-II)

Roads 6700 and 6701

SCENERY

- V1 Clearcutting with Reserves:** Reduce visual contrast with adjacent areas by using clearcutting with reserve trees (even-aged system) as a harvest prescription (see Appendix G to Forest Plan FEIS). (VIS11 - III)

Units 2A, 3, 4, 5, 7, 7A, 8, 10, 11, 12A, 12D, 13A, 14

- V2 Reserves Under a Two-aged Harvest System:** Reduce visual contrast with adjacent areas by leaving reserve trees under a two-aged system as a harvest prescription (see Appendix G to Forest Plan FEIS). (VIS11-III)

Units 2A, 2D, 3, 4A, 7C, 8, 9, 10, 12, 12A, 12C, 13, 13B, 14, 15, 16, 17, 17A, 18, 20, 20A, 28, 29, 30

- V3 Patch/Strip Clearcutting:** Reduce visual contrast with adjacent areas by using patch or strip clearcutting (two-aged or uneven-aged systems) as a harvest prescription (see Appendix G to Forest Plan FEIS). (VIS11-III)

Units 2, 7B, 10A, 15, 18A, 19A, 19B, 24, 25

- V4 Selection Harvest:** Reduce visual contrast with adjacent areas by using the selection method (uneven-aged system) as a harvest prescription (see Appendix G to Forest Plan FEIS). (VIS11 - III)

Units 1, 11, 11A, 12, 31, 32, 33, 34, 35, 36, 37

- V5 LTF Design:** Use low profile LTF design to minimize visibility from Visual Priority Travel Routes and Use Areas. (VIS11-II)

Log Transfer Facilities (North and West), Road 6700

Appendix G - Mitigation

- V6 Temporary LTFs:** Use temporary LTF and incorporate rehabilitation measures into project analysis and the contract package to reduce long-term visual effects in partial retention areas. (VIS11 - II)

Log Transfer Facilities (North and West), Road 6700

SUBSISTENCE

- S1 Access Restrictions for Subsistence:** Close or restrict access on roads to maintain remoteness of areas after harvest to address subsistence issues. (SUB-I)

Roads 6700 and 6701

Appendix G - Mitigation

Kuakan Mitigation Measures by Unit or Road, and Alternative.

UNIT	Alt2	Alt 3	Alt 4	Alt 5	Alt 6	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	W1	W2	W3	W4
1	1	1	1			1			1	1										1
2					1	1	1	1											1	
2a	1	1	1				1													
2d	1	1	1			1	1	1												
3	1	1	1				1		1	1							1	1		
4	1	1					1										1			
4a			1				1											1		
5	1	1				1				1							1			
7	1						1		1	1							1			
7a		1					1										1			
7b		1					1		1	1									1	
7c			1				1		1	1								1		
8	1	1	1		1		1										1	1		
9	1	1	1				1											1		
10	1	1	1				1										1	1		
10a					1		1												1	
11	1	1					1			1							1			1
11a					1		1		1											1
12		1	1		1	1	1											1		1
12a	1		1			1	1		1	1							1	1		
12c	1						1											1		
12d	1					1	1										1			
13		1	1			1	1											1		
13a	1					1	1			1							1			
13b	1					1	1			1								1		
14	1	1	1			1											1	1		
15	1		1						1									1	1	
16	1		1			1												1		
17	1		1						1									1		
17a					1				1									1		
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18a					1				1										1	
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30					1	1	1		1									1		
31				1		1	1	1												1
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33				1		1	1		1											1
34				1		1	1		1											1
35				1		1	1		1											1
36				1		1	1		1											1
37				1			1		1											1
	23	16	19	7	16															
Roads																				
6700	1	1									1		1	1	1	1				
6701	1											1	1	1	1	1				

Appendix G - Mitigation

Kuakan Mitigation Measures by Unit or Road, and Alternative.																					
UNIT	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	W16	R1	V1	V2	V3	V4	V5	V6	S1	
1		1			1							1					1				
2		1				1										1					
2a		1				1								1	1						
2d		1				1									1						
3												1		1	1						
4														1							
4a				1	1										1						
5				1	1									1							
7				1	1									1							
7a														1							
7b																	1				
7c															1						
8												1		1	1						
9															1						
10												1		1	1						
10a												1					1				
11		1				1						1		1				1			
11a		1				1						1						1			
12		1				1						1			1			1			
12a		1				1						1		1	1						
12c												1			1						
12d												1		1							
13		1				1						1			1						
13a		1				1						1		1							
13b		1				1						1			1						
14		1				1						1		1	1						
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16		1				1									1						
17		1				1									1						
17a		1				1						1			1						
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32												1						1			
33												1						1			
34		1				1						1						1			
35		1				1						1						1			
36		1				1						1						1			
37		1				1						1						1			
Roads																					
6700			1	1	1								1					1	1	1	
6701			1		1								1							1	

Appendix H

Response to Comments

Appendix H

Response to Public Comments on the Kuakan Draft EIS

Introduction

Appendix H includes all written comments received for the Kuakan Draft Environmental Impact Statement (EIS) and the U.S. Forest Service response to the issues addressed in public comments. We received a total of 16 written comments. The Interdisciplinary Team IDT thoroughly and objectively read and analyzed every substantive issue or concern. Individual comments/issues within each letter were numbered to facilitate analysis.

The intent of the Forest Service responses is to provide an overview of Forest Service policy or direction regarding the issue, discuss how the issue has been addressed, and direct the reader to the appropriate section of the Final EIS or the Modified 1997 Tongass Land Management Plan (TLMP) for a more complete discussion.

Open House

An open house on the Kuakan project was held August 9, 1999 in Wrangell, Alaska. No one attended.

Letters Received from Individuals, Organizations, and Agencies

The following list includes all individuals, organizations and agencies that the U.S. Forest Service received comments from during the 45-day comment period following publication of the Kuakan Draft EIS.

Letter	First Name	Last Name	City	State	Organization	Page
1	James	Denison	Long Beach	CA	Individual	H-3
2	Susan	Fruchter	Washington	D.C.	US Dept. of Commerce, Office of the Under Secretary for Oceans and Atmosphere	H-4
3	Ralph	Thompson	Juneau	AK	Department of the Army	H-7
4	Jackie	Timothy	Juneau	AK	State of Alaska, Office of the Governor	H-10
5	Kevin	Hanley	Juneau	AK	State of Alaska, Dept. of Environmental Conservation	H-14
6	Jim	Cariello	Petersburg	AK	State of Alaska, Dept. of Fish and Game	H-17
7	Alice	Hanson	Wrangell	AK	Individual	H-22
8	Lori	Morgan	Redding	CA	Individual	H-25
9	Peter	Branson	Wrangell	AK	Wrangell Resource Council	H-26
10	Pamela	Bergmann	Anchorage	AK	US Dept. of the Interior	H-28
11	Janis	Searles	Juneau	AK	Earthjustice Legal Defense Fund	H-36
12	Gabriel	Scott	Talkeetna	AK	Cascadia Wildlands Project	H-38
13	Richard	Parkin	Seattle	WA	US Environmental Protection Agency	H-50
14	Jack	Phelps	Ketchikan	AK	Alaska Forest Association, Inc.	H-54
15	Marc	Wheeler	Juneau	AK	Southeast Alaska Conservation Council	H-63
16	Billie	Smith	Dallas	TX	Individual	H-75

Appendix H - Response to Comments

Letter #1: Mr. and Mrs. James L. Denison

July 8, 1999
Dear Sirs:
We are among the millions of Americans who believe that any more logging on our public forests (at huge taxpayer expense) is too much.
We (and you do, too) now know that an intact forest has much more ecological & economic value to all of us (including the local communities) than the short-term "gain" of selling our natural forest resources to timber corporations.
Tourism (especially ecotourism) is the U.S. third largest industry; it is the world's first (highest) income producer.
No one goes to Alaska to see stumps; we want to see our intact ecosystem, including fish & other wildlife. And even if you can't see the devastation from ships it is there.
The only acceptable and sensible alternative should be Alter-
nate 7 - NO ACTION - NO CUTTING! Mr. & Mrs. J. L. Denison

JLD-1

Forest Service response to Mr. and Mrs. James L. Denison

JLD-1 Congress has, in numerous laws and regulations, specifically included timber harvest among the many multiple uses of the National Forest. The Tongass Forest Plan, which took over 10 years to develop, prescribed timber harvest on about 3% of the Tongass National Forest.

A primary goal of the Modified 1997 Forest Plan is to provide for the sustainability of the resources of the Tongass National Forest, while directing the coordination of multiple uses, such as outdoor recreation, timber, wildlife, fish, watershed, and wilderness. To accomplish this goal, the Modified 1997 Forest Plan includes a wide range of land allocations spanning from areas that essentially allow no land-disturbing activities to areas allowing intensive resource development, and a set of standards and guidelines that ensure management objectives for these land allocations are met (USDA April 1999 ROD, page 3).

The Kuakan Project is consistent with the Tongass Land and Resources Management Plan (Modified 1999). The Selected Alternative (Alt 5) will provide timber without substantially altering the visual aspects of the project area through use of individual tree and group selection harvest methods, utilizing helicopter harvest exclusively. We believe that standards that will be imposed on any harvest will not lead to devastation of the Forest. The wood derived from the project is a renewable resource and is used by people for homes, paper, and other wood products. Its value does not solely go to timber sale purchasers.

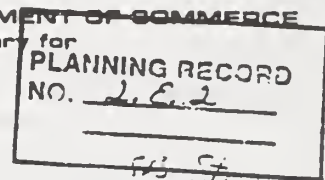
The no-action alternative was considered, but was not as responsive to the purpose and need for the project as the Selected Alternative.

Appendix H - Response to Comments

Letter #2: Susan B. Fruchter, NOAA



UNITED STATES DEPARTMENT OF COMMERCE
Office of the Under Secretary for
Oceans and Atmosphere
Washington, D.C. 20230



July 9, 1999

For Staff

Rt Randy

Mr. Steve Brady
District Ranger
Attn: Kuakan EIS
USDA Forest Service
Wrangell, Alaska 99929

Dear Mr. Brady:

Enclosed are comments on the Draft Environmental Impact Statement for Kuakan Timber Sale Tongass National Forest Petersburg, Alaska. We hope our comments will assist you. Thank you for giving us an opportunity to review this document.

Sincerely,

Susan Fruchter

Susan B. Fruchter
Acting NEPA Coordinator

Enclosure

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JUL 19 1999

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Appendix H - Response to Comments

Letter #2: Susan B. Fruchter, NOAA

MEMORANDUM FOR: Susan B. Fruchter
Acting NEPA Coordinator

FROM: Charles W. Challstrom
Acting Director, National Geodetic Survey

SUBJECT: DEIS-9907-01-Kuakan Timber Sale Tongass National Forest,
Petersburg, Alaska

The subject statement has been reviewed within the areas of the National Geodetic Survey's (NGS) responsibility and expertise and in terms of the impact of the proposed actions on NGS activities and projects.

All available geodetic control information about horizontal and vertical geodetic control monuments in the subject area is contained on the NGS home page at the following Internet World Wide Web address: <http://www.ngs.noaa.gov>. After entering the NGS home page, please access the topic "Products and Services" and then access the menu item "Data Sheet." This menu item will allow you to directly access geodetic control monument information from the NGS data base for the subject area project. This information should be reviewed for identifying the location and designation of any geodetic control monuments that may be affected by the proposed project.

NOAA-1

If there are any planned activities which will disturb or destroy these monuments, NGS requires not less than 90 days' notification in advance of such activities in order to plan for their relocation. NGS recommends that funding for this project includes the cost of any relocation(s) required.

For further information about these monuments, please contact Rick Yorczyk; SSMC3, NOAA, N/NGS; 1315 East West Highway; Silver Spring, Maryland 20910; telephone: 301-713-3230 x142; fax: 301-713-4175.

Forest Service response to Susan B. Fruchter, NOAA

NOAA-1 A search of the National Geodetic Survey's web site showed several geodetic control monuments located on Deer Island and the neighboring islands. Activities associated with the proposed timber sale will not affect any of the monuments. DALE 1916 is the closest monument to the proposed North LTF. By description and location on USGS quad map Petersburg A-1, the monument is southeast of the proposed North LTF location by approximately 1/4 mile. The Selected Alternative (Alternative 5) builds no roads, thus the North LTF will not be constructed.

Appendix H - Response to Comments

Letter #3: Ralph Thompson, US Army Corps of Engineers (COE)



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, ALASKA
JUNEAU REGULATORY FIELD OFFICE
JORDAN CREEK CENTER
8800 GLACIER HWY, SUITE 106B
JUNEAU, ALASKA 99801-8079

July 20, 1999

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JUL 22 1999

FOREST SERVICE



Regulatory Branch
East Section
9-981097

Mr. Randy Hojem
U.S. Forest Service
Post Office Box 51
Wrangell, Alaska 99929-0051

Dear Mr. Hojem:

This is in response to the June 1999, Kuakan Timber Sale Draft Environmental Impact Statement (DEIS), describing a proposed timber sale on Deer Island, approximately 30 miles southeast of Wrangell, Alaska. On November 10, 1998, we responded to a scoping letter with our preliminary comments concerning the proposal. According to the DEIS, 11.5 acres of wetlands could be impacted by road construction, depending on the alternative selected, assuming a 21-foot wide road width. The work could also involve the reconstruction of an existing log transfer facility and/or the construction of a new LTF.

The Corps of Engineers' regulatory authorities that relate to timber harvest activities are based on two laws. Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) prohibits the obstruction or alteration of navigable waters of the United States (U.S.) without a permit from the Corps of Engineers. In addition, Section 404 of the Clean Water Act (33 USC 1344) prohibits the discharge of dredged or fill material into waters of the U.S., including wetlands, without a Department of the Army (DA) permit.

The DEIS states that an existing LTF on the southwest side of the island may be used to implement any of the alternatives, but that it would have to be reconstructed since the original bulkhead and ramp were removed. DA permits typically require permitted structures to be maintained in good condition and in conformance with the terms and conditions of the permit (including the authorized plans). If the subject LTF is no longer serviceable in its current condition, a new DA permit may be required if reconstruction would involve the placement of dredged or fill material, or the construction of structures in areas subject to DA jurisdiction. We will determine particular regulatory requirements for this LTF upon receipt of the permit file number or a copy of the permit. The DEIS also states that a new LTF site at the north end of the island may be constructed. DA authorization would be required for a new LTF and any appurtenant structures (e.g. floating camps, rafting areas, outfalls, intakes, sort yards, etc.) that are constructed in waters of the U.S., including wetlands.

COE-1

Appendix H - Response to Comments

Letter #3: Ralph Thompson, US Army Corps of Engineers (COE)

-2-

The DEIS states that all new roads would be closed to motorized use at the completion of the timber sale and that road use during the sale would be restricted to timber sale activities. After the sale, roads from the switchbacks and beyond would be placed in storage and all drainage structures would be removed. The first two miles of road from the LTF would be maintained for administrative use but would be closed to other motorized traffic by placing a gate near the LTF and issuing an administrative closure order. Road closures clearly demonstrate that roads are being constructed for the sole purpose of timber harvest activities. As such, they would be exempt from regulation under Section 404 of the Clean Water Act provided the Best Management Practices (BMPs) listed at 33 CFR 323.4(a)(6) are met.

COE-2

According to the DEIS, the Road 6700 crossing at Lost Creek would be designed for resident fish passage since approximately one mile of fish habitat is present upstream. However, the road card states that mitigation measure F6 would apply, which requires maintenance of fish passage at Class II stream road crossings where feasible, using properly designed stream crossing structures. The controlling BMP for road crossings under the Clean Water Act 404 forest exemption (33 CFR 323.4 (a)(6)(vii)) states that the design, construction and maintenance of the road crossing shall not disrupt the migration or other movement of those species of aquatic life inhabiting the water body. If it were to be determined that maintenance of fish passage was not feasible, the crossing would not comply with the above 404 BMP and would therefore require DA authorization.

COE-3

Thank you for the opportunity to comment on the Kuakan Timber Sale. We are available for further discussion or clarification of our comments or regulatory requirements, as necessary. Please contact me at the letterhead address, by telephone at (907) 790-4490, or by FAX at (907) 790-4499 if we can provide further information.

Sincerely,



Ralph W. Thompson
Field Office Manager

Appendix H - Response to Comments

Forest Service response to Ralph Thompson, US Army Corps of Engineers (COE)

COE-1 No new roads will be constructed. The North LTF will not be constructed, thus we will not be applying for a permit for that site. Permits will be brought up to date for the Deer Island West LTF at the time an operator indicates a desire to use the facility. The timber sale purchaser is responsible for acquiring or updating permits for any floating camps that may be anchored in either Frosty Bay or Southwest Deer Island.

COE-2 Your concurrence for exemption from regulation under section 404 of the Clean Water Act for proposed roads is noted. No roads will be constructed in the Selected Alternative (Alt 5).

COE-3 Road 6700 crossing Lost Creek is no longer an issue because the road is not included in the Selected Alternative (Alt 5).

Appendix H - Response to Comments

Letter #4: Jackie Timothy, Division of Governmental Coordination (DGC)



OFFICE OF THE GOVERNOR

OFFICE OF MANAGEMENT AND BUDGET
DIVISION OF GOVERNMENTAL COORDINATION

☐ SOUTHCENTRAL REGIONAL OFFICE
3601 "C" STREET, SUITE 370
ANCHORAGE, ALASKA 99503-5930
PH: (907) 269-7470/FAX: (907) 561-6134

☒ CENTRAL OFFICE
P.O. BOX 110030
JUNEAU, ALASKA 99811-0030
PH: (907) 465-3562/FAX: (907) 465-3075

TONY KNOWLES, GOVERNOR

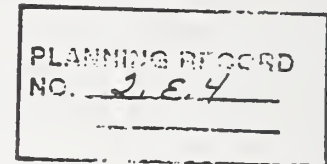
FOREST SERVICE

AUG 24 1999

RECEIVED

☐ PIPELINE COORDINATOR'S OFFICE
411 WEST 4TH AVENUE, SUITE 2C
ANCHORAGE, ALASKA 99501-2343
PH: (907) 271-4317/FAX: (907) 272-0690

August 23, 1999



Mr. Randy Hojem
USFS, Wrangell Ranger District
P.O. Box 51
Wrangell, AK 99929

Dear Mr. Hojem:

SUBJECT: KUAKAN TIMBER HARVEST
STATE I.D. NO. AK 9907-04JJ
FINAL CONSISTENCY FINDING

The Division of Governmental Coordination has completed coordinating the State's review of the Draft Environmental Impact Statement (DEIS) for the United States Forest Service's (USFS) proposed Kuakan Timber Harvest for consistency with the Alaska Coastal Management Program (ACMP) and has developed this finding based on reviewers' comments.

Project Description

The proposed Kuakan Timber Harvest is located on Deer Island, 35 miles south of the town of Wrangell, Alaska. The USFS proposes to harvest between 10 and 16 MMBF of timber from 642 to 1,345 acres on Deer Island and construct approximately 6.25 miles of specified road and 3.11 miles of temporary road on the north and east sides of Deer Island. A new direct land-to-barge log transfer facility (LTF) is proposed near the northeast tip of Deer Island. An existing permitted LTF located on the southwest side of Deer Island would be made available to operators for use. The proposed LTF and any modifications to the existing LTF would undergo separate ACMP reviews and would be subject to Alaska Department of Environmental Conservation (DEC) Certificates of Reasonable Assurance.

Consistency Finding

This consistency finding, developed under 6 AAC 50, applies to the federal consistency determination required for the project per 15 CFR 930 Subpart C.

Appendix H - Response to Comments

Letter #4: Jackie Timothy, Division of Governmental Coordination (DGC)

Mr. Randy Hojem

Page 2

08/23/99

The State has three broad areas of concern for coastal resources affected by federal timber harvest activities: fish and fish habitat, wildlife and wildlife habitat, and water quality. The State enforceable policies that address these concerns are found in the Alaska Forest Resources and Practices Act (FPA) and its implementing regulations.

The State reviewed the proposed timber harvest activity to determine if state coastal resource concerns are adequately addressed and to determine if the State agrees that the activity is consistent, to the maximum extent practicable, with ACMP enforceable policies. Based on the review of the timber harvest activity by the Alaska Departments of Environmental Conservation, Fish and Game, and Natural Resources and the Wrangell coastal district, *the State concurs with the USFS determination of consistency.*

ADGC-1

Advisories

The State appreciates that the Kuakan team has developed several alternatives for this project which focus on substitutes to clearcutting and rely heavily on the use of helicopter yarding to barges. Although a preferred alternative has not been identified at this time, the USFS prefers a helicopter alternative rather than a roaded alternative. The State also prefers a helicopter alternative and highly recommends that, of the three helicopter-only alternatives (4, 5, and 6), alternative 5 be selected for the Record of Decision as it avoids clearcutting altogether and retains approximately 65 to 75 percent of the stand within each unit. Additionally, alternative 5 provides a substantial harvest volume and a positive economic return.

ADGC-2

Please be advised the State recommends that the selected alternative include additional timing restrictions for the protection of goshawks. Also be advised that the State recommends using the Deer Island West LTF, but employing the same design features that are proposed for the Deer Island North LTF. A rock ramp with a minimal log bulkhead to accommodate barges would provide additional protection for marine resources by effectively minimizing the impacts of additional bark deposition on the benthic habitat caused by inwater log transfer.

ADGC-3

ADGC-4

The State is pleased with the level of information that was provided concerning road construction, maintenance and closure. Memorandums from the Alaska Department of Fish and Game and the Alaska Department of Environmental Conservation are attached to this consistency finding. The memorandums contain general comments and NEPA comments for USFS consideration.

ADGC-5

Please be advised that you are still required to meet all applicable State and federal laws and regulations. Your consistency finding may include reference to specific laws and regulations, but this in no way precludes your responsibility to comply with other applicable laws and regulations.

ADGC-6

If changes to the approved project are proposed prior to or during its siting, construction, or operation, you are required to contact this office immediately to determine if further review

Appendix H - Response to Comments

Letter #4: Jackie Timothy, Division of Governmental Coordination (DGC)

Mr. Randy Hojem

Page 3

08/23/99

and approval of the revised project is necessary. If the actual use differs from the approved use contained in the project description, the State may amend this consistency finding.

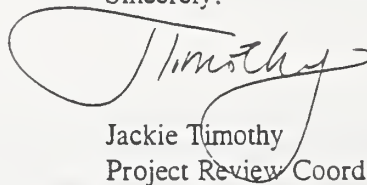
ADGC-6

Should cultural or paleontological resources be discovered as a result of this activity, we request that work which would disturb such resources be stopped, and that the State Historic Preservation Office be contacted immediately (269-8720).

ADGC-7

If you have any questions regarding this finding, please contact me at 465-8798 or email Jackie_Timothy@gov.state.ak.us.

Sincerely,



Jackie Timothy
Project Review Coordinator

Cc:

** Kevin Hanley, DEC, Juneau
** Jim Cariello, DFG, Petersburg
** Bill Hanson, DFG, Juneau
** Jim McAllister, DNR, Juneau
** Bob Palmer, DNR, Juneau
** Rex Blazer, DGC, Juneau
Judith Bittner, DNR/SHPO, Anchorage
** Ralph Thompson, COE, Juneau
** Mark Jen, EPA, Anchorage
** Duane Petersen, FWS, Juneau
** Mike Payne, NMFS, Juneau
** Carol Rushmore, coastal district, Wrangell
Buck Lindekugel, SEACC, Juneau
Tom Waldo, SCLDF, Juneau
Richard Harris, Sealaska

** = email

Appendix H - Response to Comments

Forest Service response to Jackie Timothy, Division of Governmental Coordination (DGC)

ADGC-1 Your concurrence with our determination that the Kuakan Project is consistent with the Alaska Coastal Management Program (ACMP) is noted.

ADGC-2 The State's preference for a helicopter-only alternative is noted. Alternative 5, which is a helicopter-only alternative, has been selected for the Kuakan Project.

ADGC-3 The Forest Plan provides protection for goshawks through the Old-growth Reserve strategy, 100 acre productive old growth buffers around known goshawk nests, and by permitting no continuous disturbance within the surrounding 600 feet of a nest from March 15 to August 15. The three known goshawk nests on Deer Island are within the North Old-growth Reserve. The Selected Alternative (Alt 5) includes selection of the North Old-growth Reserve. Each year we will attempt to locate the active nest for this pair and assess whether additional buffers or other protection is necessary. We do not see the need for additional restrictions on historical nest locations at this time due to the distance between nests and harvest units and helicopter flight paths. See response to ADF&G-8 for additional information.

ADGC-4 The Deer Island West LTF monitoring results to date are well within permit thresholds, thereby alleviating concern for bark accumulation associated with log-watering activities. There are logistical (tide & size) constraints for use of barge-only at Deep Bay, therefore, we didn't think it would be reasonable to require barge-only since it would substantially limit the operator's flexibility. It is likely for the Kuakan project that most logs would be flown directly to barges to be towed to a mill site or other transfer facility for sorting and scaling. However, we feel it is appropriate to allow the timber purchaser the choice to use a previously established land-based staging and log sorting site within the project area. Additional information on reconstruction of the Deer Island West LTF is included in the Final EIS, Appendix D - LTF Design.

ADGC-5 Your comment on the level of road information provide in the EIS is noted.

ADGC-6 The State will be notified of any changes to the Kuakan Project.

ADGC-7 We agree (and it is a contractual obligation) that if cultural resources are discovered, all work that could disturb such resources would be stopped and the State Historic Preservation Office would be contacted immediately.

Appendix H - Response to Comments

Letter #5: Kevin Hanley, Alaska Department of Environmental Conservation (ADEC)

MEMORANDUM

State of Alaska

Department of Environmental Conservation

TO: Jackie Timothy
Project Review Coordinator
OMB - DGC

DATE: August 3, 1999

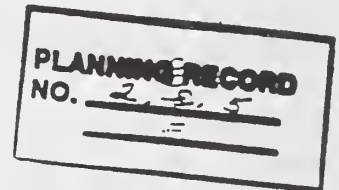
FILE NO: AK9907-04JJ

THRU:

TELEPHONE NO: 465-5364

FROM: Kevin J. Hanley *KJH*
Environmental Specialist
Division of Air and Water Quality

SUBJECT: Kuakan Timber Sale DEIS



The Department of Environmental Conservation has reviewed the Draft Environmental Impact Statement (DEIS) for the U.S. Forest Service's proposed Kuakan Timber Sale on Deer Island. Specifically, this project proposes to harvest between 10 and 16 MMBF of timber from 642 to 1,345 acres, and to construct up to 6.25 miles of specified road and 3.11 miles of temporary road, depending on alternative. In addition, under the roaded alternatives, a new direct land-to-barge log transfer facility (LTF) would be constructed at the north end of Deer Island. According to the DEIS, under all of the action alternatives, the existing permitted LTF located on the southwest side of the island would be made available for use at the operator's discretion. Any modifications to this LTF and the development of the new LTF will undergo separate Alaska Coastal Management Program consistency reviews, and will be subject to ADEC Certificates of Reasonable Assurance (401 Certifications). We offer the following comments pursuant to 6 AAC 50 of the Alaska Coastal Management Program and Section 319 of the Clean Water Act.

We are pleased that the Forest Service has developed several alternatives for this project which focus on alternatives to clearcutting and rely heavily on the use of helicopter yarding to barges. Although a preferred alternative has not been identified at this time, according to the DEIS, the Forest Service prefers a helicopter harvest alternative over a roaded alternative. We also prefer such an alternative and highly recommend that, of the three helicopter-only alternatives (4, 5, and 6), Alternative 5 be selected for the Record of Decision (ROD), as it avoids clearcutting altogether and retains approximately 65 to 75 percent of the stand within each unit. In addition, it provides a substantial harvest volume and a positive economic return. Page 3-29 of the DEIS presents an excellent discussion which would argue for the implementation of this alternative:

"When implemented by helicopter yarding, harvest prescriptions of individual or group selection, or small patch cuts which retain a high percentage (at least 65%) of trees result in less ground disturbance, and less disruption of hydrologic processes (interception, infiltration, etc.) than clearcutting or overstory removal which harvest a high percentage of trees in a stand. Therefore, high retention harvest prescriptions in these alternatives result in less erosion and sedimentation, less risk of changes in streamflow regimes, and fewer environmental consequences than low retention harvest prescriptions."

More specifically, according to the DEIS (page 3-31), "Alternatives 2, 3, 4 and 6 would have greater impacts than Alternative 5 due to their use of 'heavier' harvest prescriptions in fish-bearing

ADEC-1

Appendix H - Response to Comments

Letter #5: Kevin Hanley, Alaska Department of Environmental Conservation (ADEC)

Jackie Timothy

2

August 3, 1999

~~Watersheds."~~ and *"Although Alternative 5 results in the most acres harvested in fish-bearing watersheds on Deer Island, it uses a 'lighter' harvest exclusively, which may result in less watershed*

~~Therefore,~~ given the projected minimal impacts associated with Alternative 5, and the fact that it would provide a substantial harvest volume and a positive economic return, we highly recommend that it be chosen as the selected alternative for the ROD and that barging be used at the Deer Island West LTF rather than the proposed conventional inwater log transfer.

ADEC-1

According to the DEIS (page 2-5), *"All action alternatives would allow for reconstruction and use of the existing Deer Island West LTF."* Although no indication is provided as to what type of facility this would be, the most recent LTF at this site consisted of a bulkhead and crane for dewatering, bundling, and rewatering the logs for raft makeup. While the DEIS states that use of the site would require replacement of the bulkhead and that continued inwater log transfer would be allowed, we believe that the same design features that are proposed for the Deer Island North LTF should be used for this LTF. Specifically, according to the DEIS (page 3-21), *"In order to minimize the effects of the LTF on the marine habitat in this area [Deer Island North], the LTF would be a rock ramp with minimal log bulkhead to facilitate barge loading. Logs would be loaded directly to a barge, and no log rafts would be constructed at the LTF. The rock ramp and bulkhead would be removed upon completion of the sale."* Therefore, given the feasibility of this transfer method, and the fact that barging comprises a major component of all the action alternatives (i.e., barges will be available), it should be used in lieu of the proposed conventional inwater log transfer. Doing so would effectively minimize the impacts of additional bark deposition on the benthic habitat at this site.

ADEC-2

Pursuant to 6 AAC 50 of the Alaska Coastal Management Program and 11 AAC 95 (the Forest Practices Regulations), the department concurs with the Forest Service's consistency determination for this project. Our concurrence applies only to the water quality and fisheries aspects of this sale. We are able to agree with this determination based, in large part, on the level of information that was provided concerning road construction, maintenance and closure. In addition, the proposed full implementation of the TLMP process group standards and guidelines (RIP2, III, E) along all Class I, II, and III streams within the project area provides reasonable assurance that yarding will be carried out consistent with the standards of 11 AAC 95.360(a).

ADEC-3

We appreciate the opportunity to comment.

cc: Jim Cariello, ADF&G
Bill Hanson, ADF&G
Tom Paul, ADF&G
Carol Hale, USFWS
Ralph Thompson, USACOE
Bill Ryan, USEPA
Randy Hojem, USFS
Steve Brady, USFS
Carol Jorgensen, USFS

Forest Service response to Kevin Hanley, Alaska Department of Environmental Conservation (ADEC)

ADEC-1 ADEC's preference for a helicopter-only alternative is noted. Alternative 5 has been selected for the Kuakan Project.

ADEC-2 See Forest Service response to ADGC-4. Additional information on reconstruction of the Deer Island West LTF is included in the Final EIS, Appendix D - LTF Design. Recent surveys at the site (1997 dive report) indicate bark accumulation in the benthic habitat at this site is minimal (See Fisheries, Watershed and Marine Resources section of the Kuakan EIS).

ADEC-3 Your concurrence with our determination that the Kuakan Project is consistent with the Alaska Coastal Management Program (ACMP) is noted.

Appendix H - Response to Comments

Letter #6: Jim Cariello, Alaska Department of Fish and Game (ADF&G)

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME

HABITAT AND RESTORATION DIVISION

TONY KNOWLES, GOVERNOR

Box 667
Petersburg, AK
PHONE: (907) 772-3801
FAX: (907) 772-9336

PLANNING RECORD

NO. 2.8.6

MEMORANDUM

TO: Jackie Timothy
Project Review Coordinator
Division of Governmental Coordination
Juneau

DATE: 8/13/99

FILE NO.: AK 9907-04JJ

FROM: Jim Cariello
Habitat Biologist
Petersburg

SUBJECT: Kuakan Timber Sale DEIS

The Alaska Department of Fish and Game (ADF&G) has reviewed the materials provided by the USDA Forest Service (FS) requesting comments on the Kuakan Timber Sale DEIS. The project proposes harvest between 10 and 16 MMBF of timber from 642 to 1,345 acres, and to construct up to 6.25 miles of specified road and 3.11 miles of temporary road, depending on alternative. In addition, under the roaded alternatives, a new direct land-to-barge log transfer facility would be constructed at the north end of Deer Island.

We are pleased that the FS has included an alternative, which emphasizes wildlife habitat through individual/group selection, retaining 65-75% of the stand. We are also glad to see that although a preferred alternative has not been identified, according to the DEIS the FS prefers a helicopter alternative rather than a roaded alternative.

ADFG-1

NEPA COMMENTS

TRANSPORTATION

The transportation costs shown in Table 2 on page 3-96, do not appear to accurately reflect the difficult road construction across the area referred to as "the switchbacks" and the higher maintenance costs in this slide prone area. In addition, the comparison of alternatives in Chapter 2 does not include unforeseen costs of slides, which are highly likely to occur, in Alternative 2. The DEIS states on page 3-83 "There is a high risk of potential slope failures that can occur during right-of-way drilling and blasting and high risk of cutslope instability. Soils are poorly drained in this area, with the

ADFG-2

AK_9907-04JJ

Appendix H - Response to Comments

Letter #6: Jim Cariello, Alaska Department of Fish and Game (ADF&G)

Jackie Timothy

8/13/99

presence of saturated organics on the surface. These sites are prime candidates for liquefaction failure during blasting."

MAPS

The legend in Fig. 2-5 (Alternative 5) displays areas with greater than/ less than 50% retention. This does not correspond with Table 2-5 on the previous page. All alternative maps appear to have the same error in the legend.

ADFG- 3

SOILS

While the mitigation Table in Appendix G indicates which units may contain slopes in excess of 72%, it would be useful to have this information displayed on a map along with the proposed unit pool and transportation plan for the Kuakan Sale. An earlier FS document, The Deer Island Unit Management Plan, 1977, contained a map depicting high hazard soils, existing landslides and V-notches.

ADFG- 4

SUBSISTENCE

Page 3-87 of the DEIS, Access to Wildlife, states "There are no known important anchorages along the sale area that would be affected by sale activities." The Coast Pilot #8, describes two anchorages along Deer Island, one at the south end in the area of the current LTF, and the other between the southern tip of Cucumber Island and Deer Island. Both of these anchorages have been identified on Fig. Water-1, page 3-23, as potential, helicopter-yarding, barge sites. In addition, the southern most anchorage, is also potentially the location of a floating camp site and a log raft storage area

ADFG- 5

The discussion of competition for salmon, finfish and shellfish in the Subsistence section, page 3-88, identifies the potential for some increased competition for subsistence fisheries resources from timber sale operations. However, this increase is not expected to be substantial do to the small number of people involved, seasonal nature and limited time frame of activities. Table Recreation-2 on page 3-43 shows that in all alternatives, logging activities are expected to last 5 seasons. The DEIS should also include a discussion of potential competition between timber sale operators and commercial fisheries resources, primarily crab and shrimp which includes an estimate of the size of the camp and number of personnel.

ADFG- 6

SILVICULTURE and TIMBER

We are confused by the differences in terminology used in the DEIS with respect to harvest prescriptions and retention. On page 2-6, harvest prescription #6 describes "...harvest 25% to 35% of the merchantable trees in the original stand." The unit card for Unit 35 (Alternative 5) states, "This alternative treats a large area and removes from 25 to 35% of the trees in this entry. The net volume per acre shown above at 9 MBF is the amount estimated to be removed. This is approximately 25-35% of the volume. About 65-75% of the volume will not be cut." On page 3-68, Table Silv -4 displays data from the Hanus Bay ATC units which was based on utilizing varying basal area percentages as retention while the Kuakan action alternatives base their retention on trees per acre or acres. The FEIS should clarify this and explain why basal area was not used and how 25% of the merchantable trees, 25% of the tress and 25% of the volume all mean the same thing.

ADFG- 7

AK_9907-04JJ

Appendix H - Response to Comments

Letter #6: Jim Cariello, Alaska Department of Fish and Game (ADF&G)

Jackie Timothy

8/13/99

WILDLIFE

Alternative 5 provides the most protection for goshawks by moving the old-growth reserve to the north end of the island and retaining the most structure within proposed units. However, we feel a timing window for helicopter yarding is necessary to avoid disturbance during the critical courtship and mating period. We suggest restricting helicopter yarding between March 1 through June 30 in Unit 31. We feel these measures will provide additional protection at a minimal inconvenience to the operator.

ADFG- 8

While the unit cards for ITM/Group Select prescriptions state no openings larger than 2 acres are expected, we hope openings this size occur infrequently. Kirchhoff (1998) found that removing a high percentage of trees from land areas as small as 0.1-0.2 ha typically resulted in even-aged regeneration, regardless of stand conditions on adjacent land.

ADFG-9

FISH, WATER, MARINE

The location of the OGR on the north end of the island will also serve to give additional protection to the limited fish habitat on the island. We also support the Bear Creek riparian restoration, which proposes removal of logging slash left from the 1988 harvest.

ADFG- 10

Since all action alternatives have potential to impact marine habitat during rafting at the existing LTF site, we recommend converting the current LTF to a barge loading ramp to eliminate the need for watering logs at the site.

ADFG- 11

Therefore, given the increased protection for wildlife and fisheries resources, individual/group selection with 65-75% retention, the relocation of the old-growth reserve to the north end of the island, and no road construction, we strongly recommend Alternative 5 be chosen as the selected alternative in the ROD. Additionally, we recommend that the selected alternative include the additional timing restrictions for the protection of goshawks, and barging at the West LTF rather than inwater log transfer to provide additional protection for marine resources.

ADFG- 12

Pursuant to 6AAC 50 of the Alaska Coastal Management Program and 11 AAC 95 (the Forest Practices Regulations), the Department concurs with the Forest Service's consistency determination for this project.

We appreciate the opportunity to comment.

cc: Bill Hanson, ADFG
Tom Paul, ADFG
Ed Crain, ADFG
Carol Hale, USFWS

AK_9907-04JJ

Appendix H - Response to Comments

Forest Service response to Jim Cariello, Alaska Department of Fish and Game (ADF&G)

ADF&G-1 ADF&G's preference for a helicopter-only alternative is noted. Alternative 5 has been selected for the Kuakan Project.

ADF&G-2 All road construction costs are included in Table Transportation-2 in the FEIS, including an allowance for additional costs associated with the "switchbacks." Alternative 5, the Selected Alternative, includes no road construction.

ADF&G-3 The map legend has been changed on all alternatives to better reflect the retention proposed in each alternative.

ADF&G-4 A map that shows MMI4 (high hazard soils) has been added to the Soils section of the EIS. In addition, the unit cards now show MMI4 classification where it overlaps into potential units. The unit cards that contain MMI4 soils have additional information addressing avoidance and mitigation measures that will be taken in each unit.

ADF&G-5 Reference to two anchorages listed in Coast Pilot #8 have been included in the Subsistence section of the EIS.

ADF&G-6 Table Recreation-2 shows the number of seasons activities could span based on a 5 year contract to complete the sale. Actual time of disturbance would probably be similar to the Campbell sale, which had all of the felling and 98% of the helicopter yarding completed in one season. Early snow and foggy weather forced the operator to shut down operations for one winter. Yarding was completed the following spring in less than two days time. Due to additional helicopter yarding search time associated with the harvest prescriptions for the Kuakan Selected Alternative, two seasons to complete the sale may be a more accurate estimate.

Floating camps were used during logging operations at Deer Island, Frosty Bay and Campbell. The Deer Island camp, which housed about 25 people, was anchored in the southwest cove of Deer Island from July 1989 through May of 1990. The Frosty Bay camp, which housed about 55 people, was anchored in Frosty Bay from November 1992 through November 1993. The Campbell camp, which housed about 35 people, was anchored in the Bradfield Canal from June 1995 through November 1995.

Timber Sale	Volume (MMBF)	Camp location	Camp use dates	Camp size (people)	Type of sale	Planned Sale Life	Length of Activity
Deer Island	14.8	Southwest Deer Island	July '89-May '90	25	Helicopter	5 years	1 year
Frosty Bay	40.1	Frosty Bay	Nov '92-Nov '93	50-60	Helicopter & Cable	5 years	1 year
Campbell	15	North Shore of Bradfield Canal	June '95-Nov '95	35	Helicopter	5 years	7 months
Kuakan	10-15	Southwest Deer Island or Frosty Bay	1-2 seasons probable	25-35	Helicopter	5 years	

Based on past use, we would anticipate a 25 to 35 person floating camp would be used, and it is highly likely the sale would be completed in one year. While it is likely that the people staying in the camp would participate in subsistence or sport fishing, we have no indications that their use would significantly affect existing subsistence, sport or commercial fisheries.

Forest Service response to Jim Cariello, Alaska Department of Fish and Game (ADF&G)

ADF&G-7 We have included additional information in the FEIS to clarify how retention is applied in each unit.

ADF&G-8 The Forest Plan provides protection for goshawks through the Old-growth Reserve strategy, 100 acre productive old growth buffers around known goshawk nests, and by permitting no continuous disturbance within the surrounding 600 feet of a nest from March 15 to August 15. The three known goshawk nests on Deer Island are within the North Old-growth Reserve. The Selected Alternative (Alt 5) includes selection of the North Old-growth Reserve. If additional goshawk nests are discovered, the forest plan standards and guidelines will be applied to each nest. We do not see the need for additional restrictions on historical nest locations at this time due to the distance between nests and harvest units and helicopter flight paths. Unit 31 is .6 miles from the closest known goshawk nest, and yarding would be to the west (away from the nest), not to the east. Timing restrictions will be applied to avoid repeated helicopter flights within 1/4 mile of all eagle nest trees from March 1 to May 31. If nests have young, we would extend the protection to August 31.

ADF&G-9 The prescription for the Selected Alternative will result in a mix of individual trees and possible small groups of trees being harvested across the landscape. Openings will likely be small and random. We will not delineate openings, but will be designating individual trees for harvest, so actual placement and size of openings will be difficult to predict. We anticipate that the harvest will largely be distributed through the stand in such a way as to create few openings even approaching 2 acres in size.

ADG&G-10 Your comments in support of the North Old-growth Reserve and the Bear Creek riparian restoration are noted. The OGR will be established on the north end of the island. Bear Creek riparian restoration will be included in sale improvement plans, but completion of the project will depend on funding becoming available either through KV funds or through appropriated funds.

ADF&G-11 Additional information on reconstruction of the Deer Island West LTF is included in the Final EIS, Appendix D - LTF Design. Recent surveys at the site (1997 dive report) indicate bark accumulation in the benthic habitat at this site is minimal (See Fisheries, Watershed and Marine Resources section of the Kuakan EIS). The design of the LTF, if reopened, will depend on the purchasers needs, and will go through the COE permitting process.

ADF&G-12 Your recommendations are noted and addressed above.

Appendix H - Response to Comments

Letter #7: Alice Hanson

RECEIVED

Box 1783

AUG 26 1999

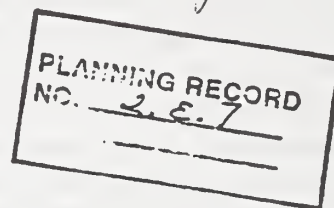
Wrangell AK
99929

FOREST SERVICE

August 23, 1999

Attn:
Randy Hojem
Wrangell Ranger District
P.O. Box 51

Re: Kuakan Sale, Deer Island



Dear Mr. Hojem,

AH-1

I'd like to comment on the Kuakan plan for Deer Island in Ernest Sound. Mainly, I'd like the Forest Service to select a roadless alternative. I believe initial road-building and subsequent environmental disruption and human access problems are perhaps the most objectionable and irreversibly destructive aspects of timber-cutting operations.

AH-2

Deer Island should remain roadless, and because of its highly visible location, bordering a heavily-used and especially beautiful north-south inland waterway ("in your face" on the route to Uman Bear Observatory, also), the visual impact of any cutting should be minimized as much as possible.

AH-3

Deer Island is very close to the community of Thoms Place and the surrounding waters are used intensively year-round by local commercial fishermen (salmon, crab, longline winter troll, etc.). I believe it would be in the best interests of all concerned —

Appendix H - Response to Comments

Letter #7: Alice Hanson

residents, visitors, personal use and commercial fishermen, hunters and trappers — to keep any timber-cutting activity on Deer Island small and dispersed, with the integrity of the island's roadless, undeveloped state in mind. Helicopter logging is obviously appropriate.

AH-3

I would personally prefer no logging at all to take place on Deer Island, since I really don't believe that a truly sustainable timber plan has yet been worked out for the Tongass, nor is the best possible use being made of the trees that are now being cut; but assuming some timber harvest will take place

AH-4

I urge you to err on the side of caution and elect small-sized helicopter cuts with plenty of retention, special attention to visuals, overall impacts, and prospects for longterm recovery.

Thank you!

Sincerely,
Alice Hanson

Forest Service response to Alice Hanson

AH-1 Your comments on the impacts of road construction and access are noted. The Selected Alternative (Alt 5) builds no roads on Deer Island.

AH-2 Your comments on the visual impacts of roads and timber harvesting are noted. The Selected Alternative (Alt 5) builds no roads and uses selective helicopter harvest spread out across the island. Similar prescriptions implemented with the Hanus Bay Alternatives to Clearcutting study resulted in virtually no change to the visual environment. The Selected Alternative has the least visual impact of all action alternatives.

AH-3 The Selected Alternative (Alt 5) is a helicopter only alternative. It spreads the harvest out across the island, and creates no large openings. The sale is expected to take one to two seasons to complete (see Response to ADF&G-6).

AH-4 All alternatives considered in the Kuakan project meet or exceed Forest Plan Standards and Guidelines. The Selected Alternative (ALT 5) provides substantially less development and less impacts to all resources than is allowed within a Modified Landscape. We feel the Selected Alternative is very responsive to your concerns about using small-sized helicopter cuts with retention and special attention to visuals and overall impacts.

Appendix H - Response to Comments

Letter #8: Lori Morgan



Ms. Lori Morgan
1951 Hartnell Ave. Apt. 3
Redding, CA 96002

The Forest Service's main purpose is supposed to protect my forest lands, not maintain a continuous supply of Tongass rainforest timber to the greedy timber barons! The best alternative is Alternative 1 (no action) for the Kuakan Project. All old-growth, riparian, and roadless areas should be off-limits to commercial logging (including helicopter logging). The Forest Service should get out of the timber industry's pockets and end all commercial logging on America's greatest rainforest. The Tongass National Forest. Commercial logging is a very destructive bad habit that is a taxpayer money loser. Old trees left alone to live out their natural lives is better than letting some redneck murder them. You should also have more protection for Alaska's amphibian populations. Thank you.

South Carolina's Cathedral Asle Trail
1,000 rail-trails created by Congress
Photo by South Carolina Wildlife and Marine R

RECEIVED

AUG 27 1999

SERVICE



STEVE BRADY
DISTRICT RANGER
ATTN: KUAKAN EIS
USDA FOREST SERVICE
P.O. Box 51
WRANSELL, AK 99929

PLANNING RECORD

2.5.8

Forest Service response to Lori Morgan

LM-1 A primary goal of the Modified 1997 Forest Plan is to provide for the sustainability of the resources of the Tongass National Forest, while directing the coordination of multiple uses, such as outdoor recreation, timber, wildlife, fish, watershed, and wilderness. To accomplish this goal, the Modified 1997 Forest Plan includes a wide range of land allocations spanning from areas that essentially allow no land-disturbing activities to areas allowing intensive resource development, and a set of standards and guidelines that ensure management objectives for these land allocations are met (USDA April 1999 ROD, page 3).

The Kuakan Project is consistent with the Tongass Land and Resources Management Plan (Modified 1999). The Selected Alternative (Alt 5) will provide timber without substantially altering the visual aspects of the project area through use of individual and group selection harvest methods.

Congress has, in numerous laws and regulations, specifically included timber harvest among the many multiple uses of the National Forest. The Tongass Forest Plan, which took over 10 years to develop, prescribed timber harvest on about 3% of the Tongass National Forest. The Kuakan project area is within this 3% of the Forest. The wood derived from the project is a renewable resource and is used by people for homes, paper, and other wood products. Its value does not solely go to timber sale purchasers.

Appendix H - Response to Comments

Letter #9: Wrangell Resource Council

PLANNING RECORD
NO. 2, E. 9

Wrangell Resource Council
P.O. Box 1727
Wrangell, AK 99929
Phone/fax: 907-874-4153

August 27, 1999

Randy Hojem, Team Leader
Attn: Kuakan EIS
USDA Forest Service
P.O. Box 51
Wrangell, AK 99929

Dear Randy:

Wrangell Resource Council (WRC) is a volunteer, grassroots conservation organization for the Wrangell area. WRC is a member organization of SEACC. In light of past logging on Kuakan, handlogging and more recent clearcutting of important riparian habitat, high grading essentially, WRC favors the no action alternative for Deer Island. However, since it is highly unlikely that the Forest Service (FS) will set precedence and choose this option, we would like to submit the following comments on the more likely scenarios.

We are glad to see the FS favor a no road plan, especially in light of recent knowledge of the dangerously steep and unstable terrain that would be encountered. And strongly encourage use of a barge rather than construction of a new LTF or reconstruction of the old one on the south end.

As you acknowledge, the proposed ferry route through Seward Passage will give passengers a good view of most of the proposed units, contrary to FS policy. Most alternatives have units on the north face visible from Thoms Place Marine State Park. While the units with at least 50 percent retention will be less noticeable, those with less than 50 will be an eyesore.

While partial cutting and overstory removal are less of a visual impact, whether they are an improvement over for wildlife habitat is doubtful, especially as winter habitat so crucial to species such as deer in winters such as the one we just had. Issues such as this and whether this high grading of the larger healthier trees is good genetics need to be discussed in the EIS. What are the results of monitoring of stand on the nearby Cambell sale? It should not be assumed, as it is on page 3-105, that partial retention units are better deer habitat than clearcuts. In times of heavy snow, a few small scattered trees are unlikely afford the access to food or shelter from the weather that an intact old growth forest would provide. In fact, they are probably little better than the traditional clear cut as high value winter habitat, especially for deer.

The northeastern location for the Old Growth Reserve is preferable to existing placement as it protects the anadromous fish stream and goshawk nests, but these nests and the stream already require large buffers, and most of the area is muskeg with only a small percentage of high value winter deer habitat. While we support protection of this area, more of the high value habitat on the southeast end should be protected. In light of previous logging and small size of the island, more deer habitat needs to be protected.

While we commend the FS efforts to try alternatives to clearcutting and avoid roads, the fact is all the alternatives with the exception of the no action propose to cut too large a volume from such a small, previously logged island. This range of 10 to 15 mmbf was probably chosen more with timber sale economics in mind than wildlife, recreation, tourism, subsistence or any of the other legitimate uses of these publicly owned lands. Private profit should be the last priority in deciding the long-term fate of this island.

Sincerely,
For WRC

Cc: SEACC

WRC-1

WRC-2

WRC-3

WRC-4

WRC-5

WRC-6

Forest Service response to Wrangell Resource Council

WRC-1 Your preference for the no action alternative is noted.

WRC-2 Your comment supporting no road construction on Deer Island is noted. See Forest Service Response to ADGC-4 and ADF&G-11 concerning construction design for the Deer Island West LTF. More information on possible reconstruction of the Deer Island West LTF is include in the Final EIS, Appendix D - LTF Design.

WRC-3 Your comments on the visual impacts timber harvesting are noted. The Selected Alternative (Alt 5) builds no roads and uses selective helicopter harvest spread out across the island, with 65-75% retention within the units. Similar prescriptions implemented with the Hanus Bay Alternatives to Clearcutting study resulted in virtually no change to the visual environment. The Selected Alternative has the least visual impact of all action alternatives.

WRC-4 The Selected Alternative (Alt 5), with 65-75% of the initial stand retained, allows harvest of some trees within units while maintaining characteristics of an old-growth stand within the unit.

WRC-5 Your concern for deer winter habitat is noted. Most of the high-value deer winter habitat is protected within the beach fringe buffer (Table Wildlife-2, Fig. Wild-1). In the course of our field work we did not see any areas of high use outside of those displayed. We agree that there is a lack of information on the benefits of partial harvesting versus clear-cut harvesting for deer. However, biologists we have consulted with believe that retaining 65%-75% of the volume of a stand (as with the Selected Alternative) will have some benefits for deer as compared to a traditional clear-cut harvest.

WRC-6 The Forest Plan provides protection for 64% of the productive old growth in the project area through Land Use Designations and Standards and Guidelines. This means that in the long term, no more than 36% of the timber in the project area will ever be harvested. The volume range of 10 to 16 MMBF would result in harvest of 17% to 25% of the suitable and available volume this entry, or between 6% and 9% of the total productive forest (See Table 2-7). The Selected Alternative (Alt 5) will result in the harvest of approximately 12.1 MMBF, which is approximately 20% of the suitable and available volume.

Appendix H - Response to Comments

Letter #10: Pamela Bergmann, US Fish and Wildlife Service (USF&WS)



United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
1689 C Street, Room 119
Anchorage, Alaska 99501-5126

RECEIVED

AUG 30 1999

FOREST SERVICE

PLANNING RECORD
NO. 2. E. 10

ER 99/589

August 26, 1999

Mr. Steve Brady
District Ranger
USDA Forest Service
Tongass National Forest - Stikine Area
P.O. Box 51
Wrangell, Alaska 99929

Dear Mr. Brady:

In response to your July 1999 request, we have reviewed the Draft Environmental Impact Statement (EIS) for the Kuakan Timber Sale. The U.S. Forest Service proposes harvest of approximately 10 to 16 million board feet of timber and construction of associated roads and log transfer facilities (LTF) on Deer Island, 35 miles south of Wrangell, Alaska, in the Tongass National Forest. We offer the following comments for your consideration in preparation of the Final EIS.

Over the past two years, Carol Hale, U.S. Fish and Wildlife Service (FWS) biologist, participated in several interagency meetings and field visits to the Kuakan Timber Sale project area. We appreciate the opportunity for early involvement, and acknowledge the project interdisciplinary team for their skilled coordination of the project. Our comments are based on information gathered during those meetings and site visits, our understanding of the revised Tongass Land Management Plan (Forest Plan), and other cited references.

USFWS-1

We have reviewed the Kuakan Draft EIS in consideration of potential impacts to fish and wildlife, their habitats, and potential impacts to fish and wildlife-oriented recreation and subsistence uses. Many of our concerns regarding this project were resolved early in the process, such as special provisions for connectivity to mitigate for previously harvested beach fringe. Our remaining concerns are presented below.

OLD GROWTH HABITAT

Connectivity The Draft EIS includes several alternatives that restrict silvicultural practices to partial harvest and require helicopter yarding in all or several units. Deer Island is less than 10,000 acres, a relatively small island within the Alexander Archipelago. It is also naturally isolated from "non-development" Land Use Designations (LUD) on other islands and the mainland. We believe that alternatives to clearcutting would help maintain forested habitat and connectivity within the island for some species, particularly small mammals, over the long term, and thus reduce timber harvest impacts to wildlife.

USFWS-2

Appendix H - Response to Comments

Letter #10: Pamela Bergmann, US Fish and Wildlife Service (USF&WS)

Old-growth Reserve Location Deer Island is entirely within Value Comparison Unit (VCU) 525. Most of the VCU is in "modified landscape" LUD, with relatively small inclusions of the "timber production" LUD. According to the Draft EIS, three different alternatives are considered for a small Old-Growth Reserve (OGR) on Deer Island. The no action alternative includes the Forest Plan OGR, which has insufficient acres to meet the minimum size criteria. Alternatives 2, 3, and 4 included the Forest Plan OGR as a base, with expansion to include additional adjacent acres on Deer Island, and the largest islands to the west of the Forest Plan OGR (hereafter referred to as the expanded OGR). Alternatives 5 and 6 include a small OGR completely separate from the Forest Plan OGR, located in the northern part of the island (hereafter called the North OGR).

A March 10, 1998, letter from the FWS expressed concern for the location of the Forest Plan OGR because it encompassed very steep terrain, and recommended consideration of an OGR in the southwestern region of Deer Island. After review of the Draft EIS, additional site visits, and consideration of other information, we believe that the North OGR is the best option. That proposed reserve meets the small old-growth reserve size criteria, and it contains some of the most important wildlife habitats on the island. According to the Draft EIS, the North OGR encompasses an important wildlife corridor for large mammals, three known goshawk nests, an important wolf use area, a large contiguous stand of deer winter habitat, the largest anadromous fish stream on the island, and a suspected marbled murrelet nesting area. Project surveys found that songbird Management Indicator Species also use the area (from information available we are uncertain whether the same species occur within the other OGRs). In addition, this reserve is more circular in shape, which will minimize forest edge effects. The aforementioned considerations lead us to believe that the North OGR is the best option for the small reserve.

USFWS -3

Use of the Timber Strata (TIMSTRA) Model for Assessing Wildlife Habitat Our experiences using the TIMSTRA model have led us to conclude that it is not the best tool for assessing the value of specific old-growth forest stands as wildlife habitats. On page 3-14, the Draft EIS states that the effects on high value habitats were measured "using forest volume under the assumption that medium and high volume stands (derived from TIMSTRA model) are more likely to contain old-growth structure." Using Geographic Information System (GIS) layers for the Kuakan project area, we developed volume class maps with information from the TIMSTRA model and the Timber Type (TIMTYP) model—the products from these two queries differed. We believe that the volume class map developed from the TIMTYP model yielded more precise representation of old-growth forest that is of higher value for wildlife because it relies on forest structure attributes, such as species composition, stand age, canopy cover, and tree crown size. Conversely, the TIMSTRA model is neither designed for, nor precise enough to distinguish between important old-growth forest structures that can, and should, be separated when assessing the potential value of an area as wildlife habitat. It is our recommendation, therefore, that the important old-growth forest related wildlife habitats be redefined in the Final EIS using the TIMTYP database.

USFWS -4

Appendix H - Response to Comments

Letter #10: Pamela Bergmann, US Fish and Wildlife Service (USF&WS)

LOG TRANSFER FACILITIES

USFWS-5

The LTF Field Investigation Report¹ recommended against development of any of the proposed new LTF sites on the north end of Deer Island. These sites are rich in plant and animal life. Some of the areas supported commercial quantities of sea cucumbers, and in others extensive beds of kelp and eelgrass occur. We therefore encourage you to seek alternatives to development of a new LTF on the northern shore. The Draft EIS states that any plans for development of an LTF on the north shore of the island will be restricted to barge operations; this option is preferred to rafting logs in water. If the decision is made to construct a new barge loading facility, we recommend removing rock ramps and bulkheads after completion of the project. We suggest that specifications for the docking facilities be included in the Final EIS.

ROAD MANAGEMENT

USFWS-6

We encourage helicopter yarding of all units in the final selected alternative, especially in consideration of the limited options for road construction and management risks identified in the Draft EIS. For example, the Draft EIS states that there are risks of mass failure associated with building roads through the "switchbacks" (page 3-96). Sedimentation of the anadromous reach of Lost Creek could occur as a result of mass failure, adversely affecting spawning and rearing habitat. Additionally, the Draft EIS states that both Alternatives 2 and 3 propose road construction near an important wolf use area; a road through this area could increase the risk of failed reproduction due to disturbance, and human-induced wolf mortality as a result of increased access.

WETLANDS

USFWS-7

The Draft EIS (page 3-102) states that Alternatives 2 and 3 are expected to have direct impacts on wetlands due to road construction. To reduce adverse habitat impacts, we encourage seeking alternatives to constructing roads through wetlands. It appears that transfer of logs from the units to the log transfer facility may be accomplished by helicopter, given the information in the Draft EIS. The economics table on page 3-75 indicates helicopter logging is likely feasible under poor and good market conditions, thus we suggest limiting impacts by further investigating, in the Final EIS, the feasibility of using aerial systems to transport logs from all sale units to transport barges. We believe that this would be in keeping with the intent of Section 2 of Executive Order 11990, regarding avoidance of new construction in wetlands.

FISHERIES AND RIPARIAN AREAS

USFWS-8

We have no significant concerns regarding impacts to fishery resources in the project area due to proposed timber harvest, because of both the low productivity of anadromous and resident fish resources in the Deer Island watersheds and the riparian management proposed by the Forest Service.

¹Unpublished report from the Fish and Wildlife Service to the Forest Service, 1997.

Appendix H - Response to Comments

Letter #10: Pamela Bergmann, US Fish and Wildlife Service (USF&WS)

To reduce adverse habitat impacts, we support the Forest Service's intent to refrain from harvesting timber within the entirety of all riparian management areas in the project area, including the riparian management areas adjacent to the prescribed buffers. Additionally, we encourage that the proposed Bear Creek riparian restoration and conifer planting be considered as part of the timber sale contract, or as mitigation for wetlands affected by road construction (Alt. 2 & 3).

USFWS-8

Furthermore, we suggest using a 60-inch culvert if a permanent crossing of Lost Creek is constructed. We believe that maintenance of the culvert on at least an annual basis should ensure that fish passage is maintained. If either long-term maintenance cannot be assured or maintenance indicates that fish passage goals are not being met, we recommend permanent removal of the crossing structure. We suggest this be addressed in the Final EIS.

SITKA BLACK-TAILED DEER

Habitat Suitability Index Values We are concerned that adjustments to the habitat capability model for the purpose of accounting for partial retention harvest may not accurately reflect the actual habitat value of an area for Sitka black-tailed deer. The Draft EIS states "we modified the deer habitat suitability scores (hsi values) to reflect the amount of retention (forest structure) remaining within harvest units, i.e., we took the difference between an unharvested unit hsi score and a clearcut unit hsi score and multiplied that by the amount of retention" (see additional specific comments below). We understand the problem of assessing the habitat suitability value of units containing retention trees, and that using a clearcut habitat suitability score may not reflect the full value of these units as wildlife habitat. However, we are unaware of any empirical data that supports adjusting deer hsi scores for this reason using the method described above. A retrospective analysis of harvested areas within Southeast Alaska, by Kirchhoff and Thomson², suggests that structure retained within a clearcut does little or nothing to enhance the immediate value of the area for deer. We, therefore, recommend that in the Final EIS, the deer hsi values for proposed retention units that leave small islands of old growth should be the same as clearcut units.

USFWS-9

Uneven-aged Management Strategy We believe the uneven-aged management harvest strategy described in Alternative 5 for an island the size of Deer Island will have less habitat impact than some alternatives; however, we recognize that this approach is experimental, and encourage monitoring to determine whether the objectives for deer habitat are met.

USFWS-10

NORTHERN GOSHAWKS

Three northern goshawk nests are located within the northern small OGR. Placement of the OGR around the nests will likely provide protection for nests and post-fledging areas. We do not know the degree to which reduction of productive old-growth forest outside reserves, but within goshawk-use areas, will affect the survival and productivity of pairs nesting within reserves.

USFWS-11

²Kirchhoff, M.D. and S.R.G. Thomson. 1998. Effects of Selective Logging on Deer Habitat in Southeast Alaska: a Retrospective Study. Federal Aid in Wildlife Restoration. Project W-24-4.5 and W-27-1, Job 2.11. Alaska Department of Fish and Game. Wildlife Conservation. Douglas, Alaska, USA. 38 pp.

Appendix H - Response to Comments

Letter #10: Pamela Bergmann, US Fish and Wildlife Service (USF&WS)

USFWS-11 Information on nesting goshawks' responses to disturbances, such as helicopter traffic, is unavailable, however, we suggest that efforts be taken to avoid repetitive disturbances of occupied nests as a precautionary measure. For example, if an occupied goshawk nest is located beneath a flight path for helicopter logging, we suggest that you consult the FWS before logging begins, to determine if specific conservation measures are appropriate. These mitigation actions should, we believe, be included in the Final EIS.

SPECIFIC COMMENTS

USFWS-12 Chapter 2, page 2-23, Fig. 2-5: The map legend states that the proposed units shown have "at least 50 percent retention" and "less than 50 percent retention." We believe that it should read "65 percent retention" and "less than 65 percent retention."

USFWS-13 Chapter 3, page 3, fifth paragraph: We recommend that the Final EIS give a definition of the dimensions for "moderate to small openings."

USFWS-14 Chapter 3, pages 3-14 & 3-15: It is unclear what "retains 65-75% of forest structure" (or stand) or "% retention" means. These percentages could be interpreted as trees in the unit, basal area, volume, or acres. The definition of "retention" in the Forest Plan is the amount of forest land (acres) removed from timber base. The unit cards in Appendix A of the Kuakan Draft EIS state 65 - 75% is "volume." The second footnote under Table Silv - 4 states that "retention percentages in units measured and marked using basal area." We recommend that the Final EIS include a definition for "percent retention."

USFWS-15 Chapter 3, page 3-99, Fig. Water-1: According to the List of Figures and paragraph five on page 3-100, the map on page 3-99 should be titled "Fig. Trans.-2. Marine Environment."

USFWS-16 Chapter 3, page 3-114 states, "The project habitat scores (hsi values) were adjusted to reflect the amount of retention of forest structure left within units." On page 3-105, the Draft EIS states that the habitat suitability index value for units with retention was calculated by taking the difference between an unharvested unit hsi score and a clearcut unit hsi score and multiplying that by the "amount of retention." We believe that "amount of retention" was intended to be "percent of retention." This error should be corrected in the Final EIS.

SUMMARY

USFWS-17 We believe that the North OGR best meets the objectives for small reserves because it includes the most diverse and important old-growth forest wildlife habitats on Deer Island. To better maintain connectivity and dispersal habitat on Deer Island, we suggest that partial harvest methods be employed in all units. Because of potential impacts to wetlands and waterways, and management concerns associated with wildlife impacts from human use of roads, we encourage use of helicopter logging where additional road building may otherwise be required. Additionally, we recommend avoiding construction of a new LTF on the northern shore of the island to protect the rich marine life occurring there. If development of a new LTF is necessary, we recommend that logs be placed directly onto transport barges to avoid inwater log storage and handling.

Appendix H - Response to Comments

Letter #10: Pamela Bergmann, US Fish and Wildlife Service (USF&WS)

We appreciate the opportunity to participate in the planning of the Kuakan Timber Sale project. We request that copies of the completed Kuakan Wildlife and Timber Resource reports to be sent to the Juneau Fish and Wildlife Service Office, 3000 Vintage Blvd., Suite 201, Juneau, Alaska 99801. Carol Hale is the lead FWS biologist on this project; please contact her at 907/586-7349, if you have questions about these comments and when opportunities arise for her to participate in any future meetings or field work.

Sincerely,



for

Pamela Bergmann
Acting Regional Environmental Officer - Alaska

Forest Service response to Pamela Bergmann, US Fish and Wildlife Service (USF&WS)

USF&WS-1 Your comments regarding early involvement are noted. Thank you.

USF&WS-2 Your comments concerning connectivity and alternatives to clearcutting are noted. While all alternatives considered allow for connectivity through beach fringe, riparian areas and old-growth reserve placement, we feel the Selected Alternative (Alt 5) does the best job of maintaining connectivity within the matrix of suitable and available lands.

USF&WS-3 We agree that the North Old-growth Reserve is the best option for the small reserve on Deer Island, and it is included as part of the decision for the Kuakan project.

USF&WS-4 The Tongass Forest Plan made use of the TIMSTRATA database for most applications and direction from the Forest Supervisor and Regional Office has been to use TIMSTRATA for consistency purposes whenever possible. The wildlife models which were revised for the Forest Plan use TIMSTRATA. We do acknowledge the utility of the TIMTYP data base for some applications, which is why we have provided you (USFWS) these GIS covers. Our wildlife biologist used TIMTYP in making recommendations on Old Growth Reserve locations, identifying important habitat areas and recommending prescriptions. We will continue to display our results in the FEIS using TIMSTRATA to be consistent with the Forest Plan.

USF&WS-5 No Log Transfer Facility will be constructed at the North LTF site.

USF&WS-6 The Selected Alternative (Alt 5) is a helicopter only alternative, with no road construction.

USF&WS-7 There will be no direct impacts to wetlands from road construction, since the Selected Alternative builds no roads.

USF&WS-8 There will be no direct impacts to fisheries and riparian areas from road construction, since the Selected Alternative builds no roads. The Selected Alternative does not include any units adjacent to fish streams.

USF&WS-9 There are a number of ways to adjust the deer model to reflect retention, none of which have been tested. We chose one strategy and clearly defined our methods in the anticipation of public feedback. After hearing your concerns and talking to ADF&G biologists, we reran the deer model for the FEIS by creating a post-harvest volume layer. Using this strategy we do not manipulate HSI values but attempt to refine the input data (volume) going into the model. This results in no change in our results for effects on high value habitat (Table Wildlife-2) but slight changes (insignificant) in deer population numbers between the DEIS and FEIS (Table Wildlife-3).

USF&WS-10 Alternative 5 is the Selected Alternative for the Kuakan project.

Forest Service response to Pamela Bergmann, US Fish and Wildlife Service (USF&WS)

USF&WS-11 As noted in the Wildlife section of Chapter 3 in the Kuakan FEIS (Effects on goshawks), the forest plan requires us to maintain an area of not less than 100 acres of productive old-growth forest generally centered over the nest tree or probable nest site. In addition, the plan requires that we permit no continuous disturbance likely to result in nest abandonment within the surrounding 600 feet from March 15 to August 15. This would preclude repeated helicopter yarding flights over an occupied nest.

USF&WS-12 The map legends have been changed for all alternatives to more accurately reflect the management prescriptions proposed in each alternative.

USF&WS-13 The reference to "moderate to small openings" is used in the context of windthrow disturbance on Deer Island. While no effort was made to measure actual sizes of openings created by past disturbance, generally "moderate to small" openings would be less than 10 acres. The FEIS has been updated to reflect this.

USF&WS-14 We have added a section to Chapter 3, under Silviculture and Timber Management, that defines how retention is being applied in each alternative.

USF&WS-15 Thank you for pointing out the error in the title of the map on page 3-99. It has been corrected in the FEIS.

USF&WS-16 You are correct in that the HSI values were calculated based on "percent of retention" rather than "amount of retention". The wording will be clarified in the FEIS.

USF&WS-17 The Selected Alternative (Alt 5) incorporates all of the suggestions you include in your summary. We appreciate the cooperation we have received from Carol Hale on this and other projects on the Wrangell District. Copies of the Kuakan Wildlife and Timber resource reports have been sent to her at the Juneau office.

Appendix H - Response to Comments

Letter #11: Janis Searles, Earth Justice Legal Defense Fund



EARTHJUSTICE
LEGAL DEFENSE FUND

BOZEMAN MONTANA DENVER COLORADO HONOLULU HAWAII
JUNEAU ALASKA NEW ORLEANS LOUISIANA SAN FRANCISCO CALIFORNIA
SEATTLE WASHINGTON TALLAHASSEE FLORIDA WASHINGTON D.C.

PLANNING RECORD
NO. 2, E-11

August 30, 1999

VIA FACSIMILE AND FIRST CLASS MAIL

Randy Hojem, Team Leader
Attn: Kuakan EIS
USDA Forest Service
P.O. Box 51
Wrangell, AK 99929

Re: Comments on Kuakan Timber Sale Draft Environmental Impact Statement

Dear Mr. Hojem:

On behalf of the Natural Resources Defense Council (NRDC), and pursuant to the requirements of 36 C.F.R. § 125.6 (b), please accept these comments on the Draft Environmental Impact Statement for the Kuakan Timber Sale.

Many of the Kuakan Timber Sale's deficiencies stem from deficiencies in the revised Tongass Land Management Plan (TLMP). NRDC's concerns about these deficiencies are detailed in an administrative appeal of the TLMP Record of Decision and a Request for Interim Relief for Timber Sale Projects Pending Resolution of the Tongass Land Management Plan Administrative Appeals. This Request for Interim Relief included the Kuakan project. NRDC incorporates by reference its joint administrative appeal of TLMP (along with the Sitka Conservation Society), Appeal No. 97-13-00-0108, the Intervenor Comments to that appeal filed by The Wilderness Society, et al., and the Request for Interim Relief. These documents raise in detail the TLMP deficiencies which are reflected in the Kuakan project and serve as NRDC's comments on the Kuakan Timber Sale DEIS. Copies of these documents, along with their exhibits, were furnished to the Region contemporaneous with their original filing with the Chief's office in Washington, D.C., and so are not included with these comments. If you would like additional copies of these documents, please contact me at 536-2751.

EJLDF-1

If you would like to discuss further NRDC's concerns with the Kuakan project, please contact Nathaniel Lawrence, Natural Resources Defense Council, (360) 570-9309.

Sincerely,

Janis Searles

cc: Steve Brady, District Ranger
Carol J. Jorgensen, Assistant Forest Supervisor

Forest Service response to Earth Justice Legal Defense Fund

EJLDF-1 The Kuakan Project is consistent with the Tongass Land and Resources Management Plan (modified 1999). The concerns you raise are forest plan issues, and beyond the scope of this project.

Appendix H - Response to Comments

Letter #12: Gabriel Scott, Cascadia Wildlands Project

PLANNING RECORD
NO. 2, E, 12

cascadia wildlands project

Gabriel Scott
Alaska Representative
POB 852
Talkeetna, AK. 99676

August 30, 1999

Steve Brady
District Ranger
ATTN: Kuakan EIS
POB 51
Wrangell, AK.

Steve Brady:

The following are the Cascadia Wildlands Project's comments on the Kuakan Draft EIS (June, 1999):

*There is no need to log any trees from Deer Island. Please remember that you are under no legal, political, economic or moral obligation to extract **any** timber from this area. Give serious consideration to the "no action" alternative.

CWP-1

*Why is there no alternative which changes the Old Growth reserve without cutting trees?

CWP-2

* The DEIS is full of assertions. NEPA explicitly requires that all claims be backed up with the best available science, and that the studies and methodology used be fully disclosed to the public in the EIS. Whether or not the conclusions are correct, it is imperative that explanation be given as to how they were reached. Similarly, it is important to disclose all gaps in available knowledge.

CWP-3

* Many of the citations that ARE given are not found in the "literature cited" section (ie. "Waters 1984" on page 3-11). This makes it impossible for the public to meaningfully evaluate your analysis.

CWP-4

* Mitigation measures must be discussed and analyzed, not merely listed by code number. For example, regarding mitigation for accidental fuel spills you assure us that you will "implement measures and plans to prevent" them. What "measures and plans" might they be? And how do we know that they will work? Please be more thorough in the Final draft.

CWP-5

* Please provide scientific backing to the hypothesis that logging will mimic natural windthrow. We have serious doubts that this is the case since one of the stated benefits of windthrow is soil churning. Certainly stumps will never churn the soil.

CWP-6

* Please provide a thorough analysis of the effects of

Appendix H - Response to Comments

Letter #12: Gabriel Scott, Cascadia Wildlands Project

cutting in small patches over a large area, versus heavier logging over a smaller area. We are very curious what studies you are using to verify claims that clumps of leave trees are of significant value to wildlife.

CWP-7

* Page 3-37 explains that evaluation of effects on critters are calculated by "measuring the changes in acres of Old growth habitat." This measurement is simplistic in that it neglects consideration of interior habitat, edge-effects, effects of roads, and habitat fragmentation. Please use the best available science, and consider these effects.

CWP-8

* Please evaluate the effect of disturbance on critters.

* We are concerned that LTF construction or reconstruction will cause irreparable damage to the marine ecosystem.

CWP-9

* Regulations are clear that appropriate surveys must be done **before** a decision is made. Assurances that class IV streams will be found during unit layout are unacceptable. How do you know they are class IV streams if nobody has ever surveyed them? How can you be certain that newly identified streams will not make the prescribed yarding methods impossible to implement. It is imperative that surveys be completed before the FEIS and ROD are written.

CWP-10

* The Magnuson-Stevens Fishery Conservation & Management Act of 1996 requires formal consultation with NMFS. Are you doing it?

CWP-11

* The effects of any action alternative on recreation are unacceptable. Deer island is good for a lot more than a "mere survival" experience.

CWP-12

* The effects of any action alternative on deer are unacceptable. The DEIS seems to overstate the value of 2nd growth stands as winter forage. Quality of forage is much lower in 2nd growth, and this must be considered. Also, the effects of increased predation by wolves (in road-building alternatives), increased hunting, and damage to travel corridors must be considered.

CWP-13

* We are concerned that leave-trees will not stand long enough to provide value for wildlife. Page 3-67 says that "during cable yarding most of these residual trees are knocked over," and the Hanus Bay study suggests that helicopters substantially damage leave trees. For example, if seven trees per acre are left standing, and three of them are knocked over during yarding, Marten S&Gs would not be met. Please provide assurance that this mitigation measure will be effective.

CWP-14

* Page 3-72 points out that residual trees make yarding with a helicopter very difficult and expensive. It also points out the importance of log-quality to making helicopter yarding profitable. Helicopters inherently high-grade, and provide incentive to

CWP-15

Appendix H - Response to Comments

Letter #12: Gabriel Scott, Cascadia Wildlands Project

sacrifice wildlife value for profits. Please consider these aspects of yarding with helicopters.

CWP-15

* While it is obvious that road-building is terrible for wildlife, helicopter logging is not much better. The disturbance to critters is incredible, the risk of fuel spills is remarkable, and damage to the upper canopy is substantial. Furthermore, helicopter prescriptions exclude many small logging operations who cannot afford the huge overhead expenses to hire helicopters. The DEIS doesn't adequately address these issues.

CWP-16

* Will trees knocked over during yarding be salvaged, or left as they fall?

CWP-17

* We agree that blowdown trees are valuable for soil churning, but prescriptions must compensate for those likely losses by leaving extra trees for wildlife habitat.

CWP-18

* Road building on Deer Island is a terrible idea. Habitat fragmentation, soil damage, and increased hunter & trapper access are likely consequences. Roadbuilding will permanently alter the character of the area, and would be accomplished at enormous cost.

CWP-19

* Unit cards reveal a network of non-system roads, but no mention is made of them elsewhere in the DEIS. Please evaluate and disclose the totality of roadbuilding prescriptions.

CWP-20

* Why is there no consideration given to landings on the road system? Cable and helicopter yarding by nature involve construction of landings and sort yards, with effects to wildlife and soil. Please disclose the location and size of landings, and evaluate their effects.

CWP-21

* What would be the effects of a floating log camp? Please consider the consequences.

CWP-22

* The DEIS makes no mention of Karsts. Appropriate surveys and an evaluation of effects on karsts is required by law, and must be accomplished before any decision is made to take action.

CWP-23

* Please consider the external economic costs of this project, especially in terms of lost jobs in tourism, damage to air and water quality, and decreased property values.

CWP-24

* We would like to remind you that the legal requirements to ensure species viability apply at the project-specific level, not merely at the Forest-wide level. The Kuakan DEIS falsely assumes that the TLMP FEIS obviates the need to guarantee viability of species in the project area.

CWP-25

* The cumulative effects of this project when combined with other past, present and reasonably foreseeable actions must be thoroughly evaluated. A simple listing of other timber sales is inadequate. Alternatives which involve road construction deserve

CWP-26

Appendix H - Response to Comments

Letter #12: Gabriel Scott, Cascadia Wildlands Project

special attention. Once the island is roaded that would provide a powerful incentive for future logging, and would almost certainly increase future impacts of hunting, trapping and recreation.

CWP-26

* The project area is critical habitat for the Queen Charlotte goshawk. Industrial logging would pose a serious and unjustifiable threat to the continued viability of goshawks, especially when the cumulative effects of this and other projects is considered. The Kuakan DEIS inadequately addresses these threats. For example:

- >there is no analysis of the project's effect on goshawk prey species, or on critters that prey on goshawks;
- >there is inadequate analysis evaluating possible disturbance to goshawks;
- >there is no analysis of forest-edge effects or habitat fragmentation.

CWP-27

These shortcomings must be corrected before a decision to log is made.

* Deer island contains a large amount of high value habitat for marten. Industrial logging would seriously compromise that habitat, with predictable negative effects on the viability of marten populations. The DEIS inadequately addresses those impacts. For instance:

- >little appreciation is given to the increase in trapping which would result from roadbuilding;
- >the increasing subsistence needs of local human residents is not dealt with;
- >the effects of habitat fragmentation are ignored entirely;
- >there is a severe shortage of documentation that proposed mitigation measures would be effective.

CWP-28

These shortcomings must be corrected before a decision to log is made.

* The most recent science must be used in evaluating the effects of timber harvest on wolves. The impacts of roads, disturbance, decreased deer population, and increased human harvest should be thoroughly documented. Surveys must provide assurance that no dens would be disturbed.

CWP-29

* Action alternatives would have unacceptable impacts on neotropical migratory birds.

CWP-30

* Scientific reasons must be explicitly stated to back up claims regarding Keens Myotis, neotropical migratory birds, songbirds, and Olive-sided Flycatchers.

CWP-31

* Page 3-117 mentions slash burning. Please disclose your plans for burning, and evaluate the possible effects.

CWP-32

* Many of the units appear to be located on steep slopes, yet only a few of these unit cards mention that as a concern. (For

CWP-33

Appendix H - Response to Comments

Letter #12: Gabriel Scott, Cascadia Wildlands Project

example, oversteep slopes are listed as a concern in unit 12A, but not in unit 12, and both of those unit designs cover the same land). Please provide references explaining why some steep units present soil concerns, while other steep units do not. Or even better, drop all unstable areas from consideration for logging or roadbuilding.

CWP-33

* Legal requirements for buffer zones around streams include a windfirm boundary around the buffer zone, yet this is not reflected on the unit cards. Please offer indications that buffer zones will be windfirm.

CWP-34

* Many of the unit cards (eg. unit 4) list location within post-fledging areas as a concern, and then under "mitigation" it says that the unit boundaries were modified to avoid those areas. Are these units as currently proposed within post-fledging areas or not?

CWP-35

* Wetlands must be avoided whenever practicable. Please don't log or build roads on wetlands, or at least explain why they can't be avoided.

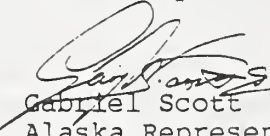
CWP-36

* Unit 3 appears to call for cable-yarding downhill to the road on a very steep slope. Is that a practical and safe method?

CWP-37

Thank you for thoughtfully considering these comments.

Sincerely,



Gabriel Scott
Alaska Representative
Cascadia Wildlands

Project

POB 852
Talkeetna, AK. 99676

Forest Service response to Cascadia Wildlands Project

CWP-1 Congress has, in numerous laws and regulations, specifically included timber harvest among the many multiple uses of the National Forest. The Tongass Forest Plan, which took over 10 years to develop, prescribed timber harvest on about 3% of the Tongass National Forest.

A primary goal of the Modified 1997 Forest Plan is to provide for the sustainability of the resources of the Tongass National Forest, while directing the coordination of multiple uses, such as outdoor recreation, timber, wildlife, fish, watershed, and wilderness. To accomplish this goal, the Modified 1997 Forest Plan includes a wide range of land allocations spanning from areas that essentially allow no land-disturbing activities to areas allowing intensive resource development, and a set of standards and guidelines that ensure management objectives for these land allocations are met (USDA April 1999 ROD, page 3).

The Kuakan Project is consistent with the Tongass Land and Resources Management Plan (Modified 1999). The Selected Alternative (Alt 5) will provide timber without substantially altering the visual aspects of the project area through use of individual tree and group selection harvest methods. The no-action alternative was considered, but was not as responsive to the purpose and need for the project as the Selected Alternative.

CWP-2 The decision maker could chose to implement parts of any alternative, without implementing an entire alternative as presented in the Draft EIS. Presenting an alternative that only dealt with changing the Old-growth reserve would have duplicated the No-Action alternative for all resources except Biodiversity and Old-growth. The information provided in the Biodiversity and Old-growth section of Chapter 3 fully discloses the differences in the three reserve locations that were considered throughout the analysis of the Kuakan project. The information is available within the analysis for the decision maker to modify the old-growth reserve without cutting trees, without the need for developing a separate alternative.

CWP-3 The EIS makes reference to existing data, to field experience gained from actual implementation of similar projects in similar situations, and makes use of models and literature citations to gauge impacts and predict outcomes. Though your comment is a general one, our review of the specifics of the document indicate that the conclusions in the EIS are generally well supported within the framework of data, experience, literature and modeling previously described. We believe that we have cited the important points, and believe it is not realistic to cite a reference for every statement in an EIS. Page 3-4 of the FEIS discusses the fact that we have less than complete knowledge about many of the relationships and conditions of wildlife, fish, forests, jobs and communities.

CWP-4 The Literature Cited section has been updated in the FEIS in an attempt to include all documents referenced. We regret the omission of 2 citations from the DEIS, including (Waters, D.L. 1992) and (Waters, J. 1984).

CWP-5 The mitigation measures identified in Chapter 2 of the EIS are implemented through a variety of avenues, with "avoidance" being one of the primary means. The example you site regarding mitigation for accidental fuel spills is part of the standard timber sale contract. The contractors (timber sale purchaser) Spill Prevention Control and Countermeasures (SPCC) plan includes measures that address prevention of petroleum spills and also needs to address clean-up of accidental spills. The SPCC plan needs to meet applicable Environmental Protection Agency (EPA) requirements in 40 CFR 112.

Forest Service response to Cascadia Wildlands Project

The effectiveness of mitigation measures is determined through monitoring. The Mitigation Measures section in Chapter 2 of the Kuakan EIS discusses general and site-specific mitigation measures and the source of the measure (Forest Plan Standards and Guidelines and Best Management Practices). The unit cards in Appendix A and road cards in Appendix B contain additional information on specific mitigation measures. The current mitigation measures have been developed and refined through application and implementation monitoring on various projects across the forest. Mitigation measures evolve as additional information is gathered through project and forest plan monitoring. The Tongass National Forest Annual Monitoring and Evaluation Report includes analysis and reports of the effectiveness of mitigation measures.

CWP-6 We do not state or infer that logging will mimic natural windthrow. The intent of planning harvest in areas that receive a higher amount of natural disturbance is to more closely emulate natural stand conditions. Stands that are subject to disturbance generally have even-aged or multi-cohort stands. Compared to converting old-growth forests to one or two aged stands, harvesting timber in even-aged or multi-cohort stands creates a stand structure more like that created by natural disturbance events.

We agree that soil churning from windthrow can be beneficial to soil productivity, especially on gentler slopes where it will not erode. On steeper slopes (>60%), the risk of soil erosion or mass movement is increased, so special consideration is given to minimize soil disturbance from windthrow and yarding.

CWP-7 The trade-offs between concentrating harvest in a small area and spreading out the harvest over a larger area are going to differ for each species and will relate to their sensitivity to opening size and species-specific dispersal abilities (see page 3-18 in the FEIS for more discussion). We agree that there is very little information available on wildlife use of partial harvest stands. We considered results from the Hanus Bay Alternatives to Clear-cutting (Forest Service study) and Matt Kirchoff's report on the effects of selection logging on deer habitat (1998). In the Hanus Bay Study, "impacts to wildlife and biodiversity values were minimal in the 75% retention unit". Although studies are limited, it is possible that a harvest method which leads to an uneven-aged stand structure will be more beneficial to old-growth dependent species than harvest methods that lead to even-aged stand structures, even when more acres are treated.

CWP-8 The measurement you reference is one of four measurements used to compare effects on the conservation biology strategy, which relates to "critters", but is not the only measurement. A recent conference on fragmentation in the West concluded that "quantity of habitat" was more important than fragmentation indices in determining population viability (planning file). Please review the Wildlife and Threatened, Endangered Species sections of the EIS. We acknowledge that increased human activity could have impacts to individual animals, however long term population viability is not significantly impacted by any of the alternatives considered for the Kuakan project.

Forest Service response to Cascadia Wildlands Project

CWP-9 The Selected Alternative does not construct the Deer Island North LTF. Surveys conducted at the existing Deer Island West LTF indicate minimal bark deposition remaining from previous use. We share your concern for protection of the marine ecosystem, but we believe that with the constraints put on reconstruction and use of the Deer Island West LTF, it will not result in irreparable damage to the environment. See also the Forest Service response to ADGC-4 and ADF&G-11.

CWP-10 NEPA requires us to gather information sufficient to make a reasoned decision. The intent of field verification is to confirm inventory data and to determine the feasibility and general design and location of a unit or road, not to locate the final boundaries. Minor changes are expected during implementation to better meet on-site resource management and protection objectives. While many streams are identified and surveyed during fieldwork for the EIS, a full survey of every class IV stream at the DEIS stage would be cost prohibitive and unnecessary. As it turns out, the Selected Alternative uses helicopter yarding exclusively, thus discovery of additional class IV streams will not affect the overall yarding method.

CWP-11 The Fish, Water, Marine section of Chapter 3 in the FEIS (page 3-27) discusses Essential Fish Habitat and the Magnuson-Stevens Fishery Conservation and Management Act of 1996. The EIS satisfies the consultation requirements by providing a description and assessment of Essential Fish Habitat in the project area, a description of the Kuakan project and its potential impacts on these habitats, and a description of the mitigation measures that will be implemented to protect these habitats.

CWP-12 Deer Island receives very little land-based recreational use. Deer hunting is very low based on harvest records and local knowledge. There are no roads or established trails on the island. Most recreational use in the area is boat-based, and may include views of Deer Island. The Selected Alternative will tend to have minimal visual impacts and will result in minimal effects to recreation. The Recreation Opportunity Spectrum (ROS) inventory classes would not change because there are no roads proposed in the Selected Alternative, and the harvest prescription would likely result in unnoticeable harvest. The only likely disturbance to recreation from the selection alternative would be the small chance of displacement of recreationists during harvest operations. Harvest on several sales in the area has occurred in the past without known impacts to recreation intensity.

CWP-13 As discussed in the Wildlife section and shown in Table Wildlife-3, under any alternative, deer habitat capability will remain over 30 deer/sq. mile, which is sufficient habitat for meeting hunter needs and maintaining wolf populations. The findings of the EIS are that the project will not likely have any significant impact on deer.

Forest Service response to Cascadia Wildlands Project

CWP-14 The statement you reference on page 3-67 of the DEIS pertains to residual trees smaller than 9 inches at DBH. Many of these small whips are indeed knocked over during cable yarding, if logs are not suspended. Uphill cable yarding with adequate suspension and lateral yarding can reduce damage to residual saplings as well as reduce damage to larger trees. In the case of the Kuakan project, the Selected Alternative only removes 25% to 35% of the stand, so meeting martin standards and guidelines will not be a problem. Experience with helicopter yarding leads us to conclude that blow-down from prop wash is highly unlikely to result in Forest Plan Standards and Guidelines not being met, particularly when 65%-75% of the original stand will be retained in place.

CWP-15 You are correct in your assessment that often helicopter sales will target trees that produce higher monetary returns than conventional cable sales. We disagree that this inherently provides incentive to sacrifice wildlife values for profits. We believe that the Selected Alternative balances the desire to retain the maximum amount of structural diversity within the existing stands for wildlife benefits with the desire to produce an economically viable timber offering. High value wildlife trees are not necessarily the same as high value timber trees. For example, a 30" spruce with a broken top, buttressed roots, large limbs and high defect is worth very little from a timber standpoint, but is very valuable for wildlife. A 30" spruce with very few limbs, no defect, a small cone crop and without buttressed roots may not have many wildlife benefits, but is very valuable for the quality of wood it contains.

CWP-16 We agree that logging can have detrimental effects on other resources, which is why we have prepared this EIS. We feel we have adequately addressed concerns through implementation of standards and guides, best management practices and site-specific mitigation measures. You are correct in stating that helicopter prescriptions exclude many small logging operations. However, your other comments against road building indicate that you are not supportive of any road construction. In balancing the alternatives on this particular sale, it appears that helicopter logging, given the relatively close access to water for all of the project area and the species mix, is a viable economic alternative.

CWP-17 The sale administrator, in concert with the wildlife biologist and other resource specialists, has the authority to salvage trees that are inadvertently knocked over during yarding. The decision to remove those trees is made on a case by case basis. Though some trees may be knocked over during yarding, our extensive experience has been that this is not a significant factor, especially when a large percentage of the original stand has been retained, as it will be in the Selected Alternative.

CWP-18 We believe the prescriptions in the Selected Alternative leave adequate trees for wildlife habitat.

CWP-19 The Selected Alternative builds no roads on Deer Island.

Forest Service response to Cascadia Wildlands Project

CWP-20 All potential roads are shown on the unit cards and discussed in the text of the EIS. Alternative 2 proposed a total of 9.36 miles of road, and Alternative 3 proposed a total of 4.14 miles of road. That includes specified and temporary roads. The Transportation section of the FEIS describes the potential road network, including non-system (temporary) roads. Both system and non-system roads were used to calculate the "Potential Amount of Soil Disturbance" (Table Soils-1) on page 3-83 of the DEIS.

CWP-21 Final landing locations are determined through final unit layout. The Selected Alternative uses helicopter only yarding with landings on barges or possibly at the Deer Island West LTF.

CWP-22 We have added additional information concerning the effects of a floating log camp to the subsistence section of the EIS.

CWP-23 There is no known karst on Deer Island. Most of Deer Island is mapped as the Hornfelsed Seymour Canal formation of Miocene &/or Oligocene age, and a massive Migmatic granitic rock type. Neither type is conducive to karst development. No indications of karst were discovered by any field crew during the inventory stage of this project.

CWP-24 The Kuakan project EIS tiers to the Forest Plan FEIS, which included analysis of broader based effects and economic costs. Concerns for air and water quality are discussed in the FEIS. We have no indications that implementing any action alternatives would result in a loss of jobs in tourism. We have no established means of measuring a correlation between the proposed project and decreased property values. Several landowners at Thoms Place, located 7 miles away, may have oblique views of Deer Island. The Selected Alternative would result in very little change to the seen area, thus having little impact to property values that may have a view of the project area. The response to CWP-13 also points out that there is not likely to be a significant effect to tourism. The effects to air and water quality are discussed in the EIS and will be minimal as described.

CWP-25 The Forest and Rangeland Renewable Resources Planning Act of 1974 specifies that forest plans "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives, and within the multiple-use objectives of a land management plan adopted pursuant to this section, provide, where appropriate, to the degree practicable, for steps to be taken to preserve the diversity of tree species similar to that existing in the region controlled by the plan" (Sec. 6 (g)(3)(B)). Forest Planning Regulations at 36 CFR 219.19 states: "Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area." The planning area referenced is the area covered by the Forest Plan, not the area covered by a single project. The Forest Plan scale is the appropriate scale to address the viability of widely ranging species such as the northern goshawk and Sitka black-tailed deer. We know of no small species endemic to Deer Island with viability concerns. If such a species existed, it is unlikely that we would negatively effect viability due to the amount of productive forest that will not be harvested and the amount of structure left within harvest units in the Selected Alternative. The USF&WS and NMFS agree with our assessment that the Kuakan project will not have a detrimental effect to endangered or threatened wildlife populations, or to species viability.

Forest Service response to Cascadia Wildlands Project

CWP-26 The cumulative effects portion of the Subsistence section and the Environmental Consequences portion of the Wildlife section in the FEIS address this concern. Also pertinent is the Biodiversity and Old-growth section of the FEIS. Through selection of Alternative 5 with the North Old-growth Reserve, at least 2/3 of the productive old-growth in the Kuakan project area will remain in an unharvested state in the future, even if all the current suitable land was harvested.

CWP-27 The Kuakan project implements the Forest Plan conservation biology strategy through modification of the old-growth reserve, buffers around known goshawk nests, and implementation of goshawk standards and guidelines. Additional studies are being conducted on the Tongass, and results from these studies will be included in ongoing NEPA projects, if new information results in management changes. For example, ADF&G and the Forest Service are assisting in a study to look at the importance of prey species to goshawks. We know of no studies that link fragmentation of habitats in Southeast to goshawk reproductive performance. From previous telemetry studies we know that goshawks utilize edge habitats and sometimes forage within clearcut openings. Therefore, it would be premature to say that logging will reduce prey species for goshawks to an unacceptable level or that any amount of edge habitat has a negative effect. We have worked closely with ADF&G goshawk biologists and with the USFWS to delineate nest buffers and account for potential logging disturbance.

CWP-28 Your comment is addressed in the Marten portion of the Wildlife section. Until better information becomes available, implementation of Forest Plan Standards and Guidelines is thought to provide for viability of marten populations. The Selected Alternative for the Kuakan project far and away exceeds the minimum requirements of the forest plan. No roads will be built with the Selected Alternative. There has been no recorded harvest of furbearers (including marten) on Deer Island in the last 10 years. We have no evidence that they exist on the island.

CWP-29 The Selected Alternative includes no road building. Access will not be improved for hunters or trappers, thus impacts to both deer and wolf populations are minimized.

CWP-30 There is no scientific evidence that our action alternatives would have "unacceptable impacts on neotropical birds". Recent studies indicate that neotropical bird populations in the Western U.S. have remained relatively stable (Robinson). The Selected Alternative retains old-growth structure throughout the project area. For species that are dependent on old-growth, this timber sale may impact individuals, but will not contribute to a loss of population viability due to the amount of habitat remaining in an unharvested state. The Wildlife section of the EIS contains more information pertinent to your question.

CWP-31 Reasons that we believe the Selected Alternative will have little impact to birds and other species is clearly stated in the Wildlife section and throughout the EIS; Based on the current Forest Plan, 2/3 of the existing old growth in the project area will remain indefinitely. Conversely, timber harvesting may create habitat for the Olive-sided Flycatcher, a species that depends on snags within openings.

Forest Service response to Cascadia Wildlands Project

CWP-32 Burning is one method of disposing of slash that accumulates at landings. Other options are to back-haul slash back to harvested units. The timber operator is responsible for disposing of slash in compliance with state and federal clean-air and clean-water standards.

CWP-33 Unstable areas are identified based on Order 3 soil mapping and field reconnaissance. It is not always possible to avoid harvest or road building on all unstable areas. In making the decision to operate on unstable slopes, a risk assessment based on site-specific information is considered. Generally, mitigation measures are implemented which reduce the risk of hillslope failure and other impacts. Interpretations of "instability" and risk of management induced failure are based on traditional clearcut harvest prescriptions. We believe that partial harvest which retains a high percentage of the stand, thus a high percentage of the live roots, will have less impact than traditional clearcuts. The Selected Alternative has no road construction, and harvest units will be laid out to avoid area where there is a concern of management induced hillslope failures. Please review the unit cards again, and note that unit 12 and unit 12A do not cover the same land. Unit 12A is north and west of unit 12.

CWP-34 Riparian buffers are included in the unit cards. In some instances, these streams bisect a unit. The prescription for the Selected Alternative removes only 25% to 35% of the stand, thus not creating large openings that can catch the wind. Therefore, we feel windfirmness around streams is not an issue.

CWP-35 Units 1, 4, 4a and 5 are the only units that had portions that may have been within the post-fledging area of the known goshawk nests. The unit designs as presented in the DEIS were adjusted to avoid the 100 acre nest buffer required by Forest Plan Standards and Guidelines. None of these units are in the Selected Alternative.

CWP-36 Wetlands are avoided to the maximum extent practicable within each action alternative. The Selected Alternative builds no roads on wetlands, or anywhere else.

CWP-37 Unit 3 was designed for downhill cable yarding and is feasible as such, however, it is not in the Selected Alternative.

Appendix H - Response to Comments

Letter #13: Richard Parkin, US Environmental Protection Agency (EPA)



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

PLANNING RECORD
NO. 2. E. 13

August 31, 1999

Reply To
Attn Of: ECO-088

Ref: 98-035-AFS

Carol J. Jorgensen
Assistant Forest Supervisor
Stikine Area
Tongass National Forest
P.O. Box 309
Petersburg, AK 99833

RECEIVED
SEP 07 1999
FOREST SERVICE

Dear Ms. Jorgensen,

The Environmental Protection Agency (EPA) has completed its review of the draft Environmental Impact Statement (EIS) for the proposed **Kuakan Timber Sale**, pursuant to our responsibilities and authorities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. In addition to the no action alternative, the draft EIS evaluates five action alternatives that would harvest between 10 and 16 million board feet (MMBF) of timber on Deer Island, located approximately 35 miles south of Wrangell, Alaska. The draft EIS does not identify an agency-preferred alternative.

Overall, we are pleased to see that the range of alternatives evaluated in the draft EIS places a high emphasis on non-clearcutting harvest prescriptions, the use of helicopter logging and the direct transfer of logs to barges. We see the use of these approaches as being much more environmentally desirable than the ground-based, clearcutting approaches historically used on the Tongass which relied heavily on road building and the direct transfer of harvested logs to water.

EPA-1

Based on our review of the draft EIS, we have assigned the following ratings to each of the alternatives under consideration based on the potential significance of the environmental impacts and adequacy of the impact statement in fulfilling its disclosure function pursuant to NEPA.

ALTERNATIVE	RATING
1 (No Action)	LO (Lack of Objections)
2 (Optimize Timber Volume/Economics)	EC-2 (Environmental Concerns - Insufficient Information)
3 (Optimize Cable Harvest on North Deer Island)	EC-2 (Environmental Concerns - Insufficient Information)
4 (Maximize Helicopter Harvest Economics)	EC-2 (Environmental Concerns - Insufficient Information)
5 (Uneven-aged Management)	LO (Lack of Objections)
6 (Natural Disturbance Pattern)	EC-2 (Environmental Concerns - Insufficient Information)

Appendix H - Response to Comments

Letter #13: Richard Parkin, US Environmental Protection Agency (EPA)

2

- We have no objections to Alternatives 1 and 5. Alternative 1 would result in no adverse environmental impacts because no timber harvesting would take place. Alternative 5, with its use of helicopter logging and a high (65-75 %) retention harvest prescription, would result in the least amount of ground disturbance, minimize impacts to hydrologic functions, maintain the highest level of visual quality, and provide for the greatest level of wildlife security of all the action alternatives. This alternative includes all these environmentally-friendly attributes, while also providing a positive economic return. Based on the information presented in the EIS, we believe that Alternative 5 represents the environmentally-preferred action alternative and strongly recommend its selection for implementation.

EPA-2

We have environmental concerns with Alternatives 2 and 3, as both alternatives would include clearcutting prescriptions and construction of roads through the highest quality riparian habitat on Deer Island that would cross fish-bearing streams (or tributaries to fish-bearing streams). Alternative 2 would require road construction on a steep, wet slope with a high risk for mass failure. Alternatives 2 and 3 would also require the construction and operation of a new log transfer facility, which would result in marine and visual impacts. We also have concerns with Alternatives 4 and 6, in that they both would result in more intensive management of the proposed harvest units (when compared with Alternative 5), thereby resulting in greater impacts to wildlife security and visual quality. Alternative 4 proposes to establish an Old Growth Reserve on the west side of the island, which the EIS indicates is less desirable in addressing wildlife and biodiversity concerns. Alternative 6 would result in the greatest changes to views of Deer Island from southern and eastern viewpoints.

EPA-3

Additionally, we recommend that the EIS be revised to include discussion of how the "overstory removal" prescription identified in 4 of the 5 action alternatives would be conducted. As presently written, the EIS provides no discussion of the methods to be used with this prescription, nor if the intended results are to have two-aged or uneven-aged stands subsequent to harvest activities.

EPA-4

A summary of our comments and an overall rating of EC-2 will be published in the *Federal Register*. We have enclosed a copy of the rating system used in conducting our review for your reference.

Should you have any questions about our comments, I encourage you to contact Bill Ryan at (206) 553-8561 at your earliest convenience. Thank you for the opportunity to review this draft EIS.

Sincerely,



Richard B. Parkin, Manager
Geographic Implementation Unit

Enclosure

cc: Steve Brady, Wrangell Ranger District
Kevin Hanley, ADEC
Ralph Thompson, ACOE-Juneau

Appendix H - Response to Comments

Letter #13: Richard Parkin, US Environmental Protection Agency (EPA)

U.S. Environmental Protection Agency Rating System for Draft Environmental Impact Statements Definitions and Follow-Up Action*

Environmental Impact of the Action

LO - - Lack of Objections

The Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC - - Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO - - Environmental Objections

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU - - Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 - - Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 - - Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 - - Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

Forest Service response to US Environmental Protection Agency (EPA)

EPA-1 Thank you for the comment. It is important to understand that helicopter logging is appropriate in some places, and roads and conventional logging is more appropriate in others.

EPA-2 Alternative 5 is the Selected Alternative for implementation.

EPA-3 While we agree that alternatives 2, 3, 4 and 6 result in more intensive management of the proposed harvest units, all alternatives were developed to stay within forest-wide standards and guidelines. Strictly measuring alternatives against each other without consideration of the overall context of the project and the remaining forest structure results in an unduly narrow frame of reference.

EPA-4 The Harvest Prescriptions section of Chapter 2 and the lead-in page in Appendix A both identify overstory removal as developing into a two-aged stand. We have added a additional information to Chapter 2 and to the Silviculture/Timber section of Chapter 3 to better define retention and how the term is used in this project.

Appendix H - Response to Comments

Letter #14: Jack Phelps, Alaska Forest Association (AFA)

Alaska Forest Association, Inc.



SEP 1 1999

FOREST SERVICE

August 30, 1999

Steve Brady, District Ranger
Attn: Kuakan EIS
USDA Forest Service
P.O. Box 51
Wrangell, AK 99929

111 STEDMAN SUITE 200
KETCHIKAN, ALASKA 99901-6599
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FAX 907-225-5920

PLANNING RECORD
NO. 2, E, 14

RE: Kuakan Timber Sale DEIS

This letter is Alaska Forest Association's (AFA) response to the Kuakan Timber Sale Draft Environmental Impact Statement (DEIS), Tongass National Forest. AFA has approximately 100 members and 200 associate members throughout Alaska. AFA, its members, their employees and the timber dependent communities of Southeast Alaska depend on the Forest Service (FS) to provide economic timber sales of sufficient volume to meet the needs of the Southeast Alaska timber industry.

AFA-1 AFA has reviewed the Kuakan DEIS published and distributed in June 1999. AFA supports the Kuakan project and looks forward to the successful implementation of timber sales that help meet all the goals set forth in the Tongass Land Management Plan (TLMP), including production of sufficient timber to meet annual and planning cycle market demand from the Tongass National Forest under provisions of the Tongass Timber Reform Act (TTRA).

Purpose and Need

AFA supports the "Purpose and Need" statement for the Kuakan Timber Sale project set forth on page 1-5 of the DEIS, particularly the following:

- AFA-2
- 1) manage the timber resource for production of saw timber and other wood products from suitable timber lands made available for timber harvest: on an even-flow, long-term sustained yield basis *and in an economically efficient manner* (emphasis added);
 - 2) seek to provide a timber supply sufficient to meet the annual market demand for Tongass National Forest timber, and the demand for the planning cycle;
 - 4) maintain and promote industrial wood production from suitable timber lands, providing a continuous supply of wood to meet society's needs;
 - 5) provide a diversity of opportunities for resource uses that contribute to the local and regional economies of Southeast Alaska; and
 - 6) support a wide range of natural-resource employment opportunities within Southeast Alaska communities.

Appendix H - Response to Comments

Letter #14: Jack Phelps, Alaska Forest Association (AFA)

In addition, AFA recognizes the importance of protecting important scenic values in the Tongass as seen from "popular roads, trails, marine travel routes, recreation sites, bays and anchorages," as set forth in purpose statement #3, but suggests that a balance of interests must be factored into the interpretation of scenic values based on the overall opportunities presented by the vastness of the Tongass National Forest. Given the limited number of acres in which timber harvest is allowed under the recently revised Forest Plan, the Forest Service must seek to maximize the harvest on those areas to the greatest extent possible under applicable laws. In areas designated "Modified Landscape" within the project area, the Forest Service should attempt to address VQOs in ways that have the least impact on the productive capabilities of those areas. This attempt should include non-significant plan amendments, moving acres from Modified Landscape to Timber Production, where on-the-ground evaluations indicate that the boundaries have been misplaced and the acreage in question is *not* visible from "popular" roads, trails, etc. This approach is consistent with the frequently exercised management option of moving the boundaries of OGRs when on-the-ground analyses suggest site specific adjustments. This approach is also consistent with plan implementation discussions held between the Forest Supervisors and industry representatives in 1997 and 1998.

AFA-2

The Kuakan Timber Sale will provide important pipeline volume to support Southeast Alaska's existing and future timber industry which contributes manufacturing jobs to the regional economy. It is therefore an important part of the sales program proposed by the Forest Service to satisfy the requirements of TTRA, §101.¹ The Forest Service, in TLMP, relied on *Timber Products Outputs and Timber Harvests in Alaska: projections for 1997-2010*, by David Brooks and Richard Haynes (the 1997 Brooks & Haynes report). AFA believes the 1997 Brooks & Haynes report to be deficient in its analysis of the present and future demand for Tongass timber. The FS should acknowledge the timber industry's needs and attempt to provide the maximum economically feasible volume from the Kuakan project. While a project-level EIS is not the place to present a full-blown demand analysis, the following information should be noted and incorporated into the FEIS for the Kuakan Timber Sale project:

AFA-3

- ▶ the current installed normal operating capacity of sawmills served by the Tongass National Forest is 355.5 mmbf, and the manufacturing facilities are currently operating at less than 50% of normal operating capacity;
- ▶ the Forest Service should consider the potential for an expanding timber industry when calculating timber demand from the Tongass. For example, as of this date it appears certain that a new veneer production facility will be built and operated at Ward Cove, thus

¹ See discussion of "buffer stock" in DEIS, Appendix E, p. 13. While AFA agrees with much of what is contained in the Timber Demand section of Appendix E, we note that it understates the installed mill capacity in Southeast Alaska, placing it variously at 241 mmbf and 281 mmbf. Actually, normal operating capacity of the installed sawmills in the region is 355.5 mmbf as noted in the text of this letter. Cf. AFA's "Summary of Sawmill Capacity in Southeast Alaska," attached hereto.

Appendix H - Response to Comments

Letter #14: Jack Phelps, Alaska Forest Association (AFA)

increasing the Tongass-dependent installed mill capacity and demonstrating an aspect of demand not encompassed by the 1997 Brooks and Haynes report:

- ▶ in their 1997 analysis. Brooks and Haynes offered three scenarios varying from a low demand of 133 mmbf to a high demand of 156 mmbf. All these scenarios are well below the current normal operating capacity of Southeast Alaska's sawmills, and a sales program that is constrained by the Brooks and Haynes estimates will frustrate the efforts of Southeast Alaska's forest products manufacturers to respond to changing market opportunities;
- ▶ the Forest Service is in direct control of the timber supply needed by the domestic processing timber industry in Southeast Alaska, and the agency should recognize that every board foot of volume made available at the project level is important since the only real constraint on industry's ability to develop new markets for Alaska sawn products is supply.

AFA-3

AFA supports Alternative 2 as the Preferred Alternative for the Kuakan Timber Sale

Alternative 2 provides TLMP-required environmental protection and mitigation as well as what appears to be an opportunity for an economic timber sale. Multiple use considerations are adequately addressed in Alternative 2. Wildlife, fisheries, subsistence, cultural, visual and recreational concerns are minimized by protective measures built into this alternative.

The DEIS clearly indicates that Alternative 2 will return the greatest value to the treasury of the alternatives considered (assuming relatively higher markets and a positive net return).²

AFA has previously provided to the Forest Service suggestions for helping ensure economically viable timber sales from the Tongass timber sale program. Alternative 2 appears to incorporate some of these ideas, thus potentially resulting in an economically viable timber sale on Deer Island. The other alternatives set forth by the DEIS are unlikely to result in a sale with sufficient value to be attractive in a mid-market scenario. Alternatives 4, 5, and 6 would likely be unattractive even under high market conditions.

AFA-4

We note that the number of acres harvested from the project area is the same in Alternatives 2 and 4, and that Alternative 4 would harvest an only slightly lower volume, *but would do so at a significantly increased cost* (based on cost estimates set forth in the DEIS, which may be understated for both alternatives). Part of the reason for this is that nearly 10 percent of the projected volume in Alternative 4 is derived from NIC II timber, whereas there is no NIC II volume included in Alternative 2 (DEIS, p. 3-71). Given the costs to the agency of producing an EIS and the difficulties that the agency will have in meeting timber sale program expectations under the 1999 TLMP Record of Decision, neither the Forest Service

² DEIS, Table SE-3, p. 3-79.

Appendix H - Response to Comments

Letter #14: Jack Phelps, Alaska Forest Association (AFA)

nor the industry can afford to have deficit timber sale offerings that run the risk of going without bids.

AFA notes that recovery per mile is estimated at 1.6 mmbf in Alternative 2. This is better than many recent offerings, and the picture is improved if the ratio is calculated on the basis of volume per specified road (2.5 mmbf/mile). This latter is significant in light of the fact that approximately one third of the roads proposed under this alternative are temporary. The Forest Service should also consider using the 299 Road Standard as often as feasible to further minimize construction costs. This is especially appropriate in areas where the agency intends to close roads after harvest.

AFA-4

Harvest prescriptions in Alternative 2 are more likely to contribute to good economics than those in Alternative 4. Clearcuts with reserves will maximize the total volume harvested and minimize operating costs while still meeting TLMP retention standards. On the other hand, the overstory removal/diameter limit prescriptions of Alternative 4 are more expensive and are likely to result in more damage to the residual stands.³

The logging systems proposed for Alternative 2 will contribute more to an economic timber offering than will those in any other alternative, except Alternative 3, which suffers from offering a third less volume (than Alternative 2), most of it from the least expensive logging system, running skyline.

Small Old Growth Reserve adjustments have been a continuing issue of concern for the industry, since the trend has been to further reduce the availability of productive old growth (POG) for timber harvest.⁴ The Kuakan DEIS offers two different approaches to satisfying TLMP requirements for the small OGR in VCU 525. AFA urges the adoption of the "Revised TLMP OGR" developed for Alternatives 2, 3, and 4 and described on pp. 3-62 and 3-63. This approach minimizes the impact on Timber Production LUDs while meeting all the Forest Plan criteria. Incorporating the beach fringe into the OGR, as this approach does, is an acceptable measure under TLMP, accomplishes the alleged purpose of small OGRs and mitigates the negative effect of the OGR adjustment on the timber sale program. It is therefore an appropriate means to ensure compliance with TLMP OGR standards. On the other hand, relocating the VCU 525 small OGR to the north end of the island will have a negative impact on the near and long term timber production capability of Deer Island.

AFA-5

³ Cf. Hanus ATC data cited at DEIS, p. 6-67&68, and Table Silv-4.

⁴ Note, for example, AFA's appeal of the Crystal Creek project, and the informal disposition thereof set forth in Carol Jorgensen's letter to me of January 25, 1999. Cf. also, Sea Level Timber Sale, Record of Decision, Appendix 3, May 1999.

Appendix H - Response to Comments

Letter #14: Jack Phelps, Alaska Forest Association (AFA)

Other objectives of island management can be met without the relocation of this reserve.⁵ This project offers the Stikine Area an opportunity to contribute to the overall balance between losses of available POG and gains of available POG in small OGR adjustments across the Forest.⁶

AFA- 5

Alternative 2 is to be preferred over other alternatives, especially Alternative 3, because it best provides for future timber management options, including future economic timber sales. As discussed in the DEIS (p. 3-76), both Alternatives 2 and 4 represent the approach of using heavier harvest levels per entry with less frequent entries.⁷ From an economic perspective this is clearly preferable to more frequent entries with lighter harvest, represented by Alternative 3. It may also be preferable from the standpoint of other values and uses of Deer Island. In addition, Alternative 3 will unnecessarily preclude future management options by harvesting normally operable cable acres along the south road corridor using a helicopter system, thus making it economically unfeasible to later extend the road system and reach other potential cable units.⁸

AFA- 6

General comments on sale economics

1. The fact that the Kuakan project area is heavy to cedar⁹ is likely to contribute to positive sale economics. Unit selection should take advantage of this fact. Furthermore, the Forest Service should select an alternative that maximizes harvest from this project to contribute volume to the pipeline that can be harvested under low- to mid-market conditions.
2. Where TLMP S&Gs require structure to be left in a unit (as with measures addressing "high value" marten habitat¹⁰), the Forest Service should, to the extent feasible, meet the retention requirements by leaving unmerchantable and low value timber.

AFA- 7

AFA- 8

⁵ See DEIS, Appendix F, Consideration of Timber Management on Deer Island.

⁶ Again, *cf.* Sea Level Timber Sale, Record of Decision, Appendix 3, May 1999.

⁷ *Cf.* Appendix F, Consideration of Timber Management on Deer Island.

⁸ DEIS, p. 3-76.

⁹ Estimated at a combined 41% in the project's unit pool according to DEIS, p. 3-69. This represents figures of 20% western red cedar and 21% Alaska cedar.

¹⁰ *Cf.* DEIS, p. 3-106 and Fig. Wild-2.

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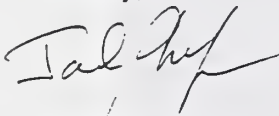
3. Among other factors, the Forest Service should consider logs per mbf, volume per acre and recovery per mile of road when evaluating the economics of each timber sale project, since viable economics is as important an issue as volume in making these sales attractive to potential purchasers.
4. Because there are no communities or micro-mill operators resident on Deer Island, the Forest Service should offer the entire volume of the Kuakan project in a single sale or in a maximum of two sales. Economies of scale are important in meeting the needs of operators likely to bid on sales in more remote locations.

AFA-9

AFA-10

The Alaska Forest Association appreciates the opportunity to participate in the planning of the Kuakan Timber Sale project. Please contact me at (907) 225-6114 if you have any questions concerning these comments.

Sincerely,



Jack E. Phelps
Executive Director

Attachment: Summary of Sawmill Capacity in Southeast Alaska

Appendix H - Response to Comments

Letter #14: Jack Phelps, Alaska Forest Association (AFA)

Sawmill Capacity

<http://www.akforest.org/sawmill.htm>

111 Stedman St., Suite 200 | Ketchikan, Alaska 99901 | Phone: 907-225-6114 | Fax: 907-225-5920 | Email: afa@ktn.net
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Summary of Sawmill Capacity in Southeast Alaska

July 8, 1998

Annual Operating Sawmill Capacity
(mmbf)*

LPC Annette Hemlock	70
Jim Ensley	5
Herring Bay	9.5
Icy Straits	10
The Mill	10
M.I.T.E.	10
Pacific Rim Cedar	7
Seley Corporation	24
Various small mills	10
Viking Lumber	40
LPC Ward Cove	50
SBL Wrangell	110

355.5



*Volumes listed reflect capacity, not
recently attained operating levels.

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Forest Service response to Alaska Forest Association (AFA)

AFA-1 Your comment supporting the Kuakan project is noted.

AFA-2 Forest Plan standards and guidelines currently allow heavier harvest within unseen areas of Modified Landscape LUDs without having to change the LUD designation to Timber Production. The Kuakan project area has very few areas that are "unseen," with much of the island visible from either Seward Passage or Ernest Sound.

AFA-3 Timber demand is addressed in the Forest Plan and in Appendix E to the Kuakan EIS. The Kuakan project is one of many timber sales on the Tongass intended to help meet demand for wood products. Actual demand projections and mill capacity are beyond the scope of this project. The alternatives considered for this project all have an associated outcome in terms of board feet available to the timber industry. Those outcomes are based on what the project area can support, not on what the exact demand or installed mill capacity is.

AFA-4 Your comment supporting Alternative 2 is noted. While Alternative 2 does return the greatest value to the treasury from a timber sale economic standpoint, economics was not the only issue considered when selecting an alternative. We have Selected Alternative 5, in part, because we feel it best balances all the issues identified in the EIS, while still providing a positive economic return. We believe several key components that can be incorporated in the timber sale contract will further improve the economic return of this alternative. We will designate the majority of trees to be removed utilizing a slot diameter limit by species. This will allow us to retain large-diameter trees containing high amounts of defect within the bole and large limbs which produce large knots, thus a lower-grade product. Generally these trees are not very valuable from a timber sale standpoint, but conversely are highly valuable from a wildlife habitat standpoint. We will also try to retain small diameter trees, that generally produce lower grade products due to their size. The slot diameter limit will allow us to harvest trees that have higher than average wood-recovery value, while minimizing impacts to other resources by retaining a significant portion of the stand. We may also modify the timber sale contract utilization standards for this sale. Utilization standards have normally required the purchaser to remove included timber up to a 6" top diameter. By increasing the top diameter limit to 10" or 12", much of the lower value top-wood can be left on the forest floor as structure for small mammals. With these considerations and the high cedar component within the Project Area, we believe Alternative 5 can result in an economically viable timber sale with minimal impacts to other resources.

AFA-5 The adjustments to the Deer Island Small Old-Growth Reserve are specifically designed to meet TLMP objectives. The north reserve is responsive to numerous site-specific factors involving goshawks, wolves, deer and other wildlife species. USFS, ADF&G and USF&WS biologists who inventoried the project area recommend the North reserve location over all others considered. Adjustments to the Deer Island Reserve will affect this and future projects on Deer Island, but will have only minor effects on TLMP outputs, with a net change of -240 acres in suitable productive old growth.

Forest Service response to Alaska Forest Association (AFA)

AFA-6 Your preference for alternative 2 is noted. As noted in the EIS, road construction is extremely difficult on Deer Island. The topography of the island (long, narrow and steep) lends itself to helicopter harvest. The topography is also one of the key factors contributing to scenic concerns (everything is visible) as well as wildlife concerns (it is a small island). The Selected Alternative takes advantage of the topography in a way that is least impactful to scenery and wildlife, and does so in a manner that enhances the economic recovery of the project (see response to AFA-4 above).

AFA-7 We agree that the high cedar component could help the economic recovery of this project. We also feel the items discussed in our response to AFA-4 above will improve the economics of the sale, even in a low to mid market condition.

AFA-8 The prescriptions for the Selected Alternative will leave more than enough structure to meet marten standards and guidelines, and will result in a sale that produces a high percentage of high value wood.

AFA-9 Logs per MBF is calculated from actual cruise data and will be available for the Selected Alternative, but we do not gather that intensive amount of information for all alternatives. Volume per acre is based on stand exam data and is included in the tables in Chapter 2 as well as in Table Silv-13 of the Silviculture and Timber section. Recovery per mile of road is readily calculated by comparing Table Silv-14 with Table Silv-15. Since the Selected Alternative builds no roads, there is no recovery per mile of road.

AFA-10 For the reasons you mention, and the fact that the entire sale relies on helicopter yarding, it is our intent to offer the Kuakan timber sale as one offering.

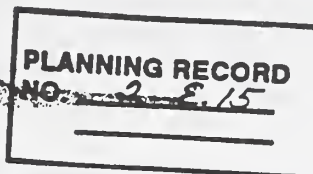
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Southeast Alaska Conservation Council

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August 30, 1999

Steve Brady, District Ranger
USDA Forest Service
Tongass National Forest, Wrangell Ranger District
P.O. Box 51
Wrangell, AK 99929

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SEP 1 1999

FOREST SERVICE

Re: Comments on Kuakan Timber Sale DEIS

Dear Mr. Brady;

The following comments are submitted on behalf of the Southeast Alaska Conservation Council (SEACC) on the Kuakan Timber Sale Draft Environmental Impact Statement (DEIS).

SEACC is a coalition of seventeen volunteer conservation groups in thirteen communities across Southeast Alaska, from Yakutat to Ketchikan, including the Wrangell Resource Council. SEACC's individual members include Alaska Natives, subsistence users, commercial and sport fishermen, hunters and guides, tourism and recreation business owners, small timber operators and high value-added wood product manufacturers, as well as concerned citizens from all walks of life. SEACC is dedicated to safeguarding the integrity of Southeast Alaska's unsurpassed natural environment while providing for balanced, sustainable use of our region's resources.

We appreciate that the Forest Service is considering alternatives that employ selection logging methods and that require no new road or log transfer facility construction. SEACC asked that such an alternative be considered in our scoping comments on the sale. If the decision is made to log in this area, SEACC urges the agency to select an alternative which requires no new road construction or in-water log transfer, which uses small patch cuts and selection logging methods, and which has no visual impacts visible from nearby Thoms Place on Wrangell Island.

I. THE DEIS FAILS TO ADEQUATELY SHOW THAT THE AGENCY IS EXEMPT FROM SECTION 404 OF THE CLEAN WATER ACT.

In Alternatives 2 and 3, the Forest Service proposes building 9.36 miles of road and 4.14 miles of road, respectively. Alternative 3 will construct 2.7 miles of roads across wetlands and Alternative 2 will construct 4.5 miles of roads across wetlands. The DEIS fails to mention that the agency may need a Section 404 permit to fill wetlands in order to construct roads. The agency must either apply for a Section 404 permit or show that they meet the requirements to be exempt from such a permit. To be exempt from the permit requirements, the agency must show that the proposed activities satisfy the requirements of the 404 exemptions and avoid the exception to the exemptions (also known as the "recapture" provision). United States v. Akers,

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785 F.2d 814, 819 (9th Cir. 1986). The Forest Service fails to meet its burden of proof that it is exempt from Section 404 permit requirements.

In order to qualify under the "normal silviculture" exemption, the proposed activities "must be part of an established ... silvicultural, ... operation..." 33 C.F.R. § 323.4(a)(1)(ii). Alternatives 2 and 3 call for logging and roadbuilding in a currently unlogged, unroaded area. Because these alternatives will bring "an area into silvicultural use" and will "change the use of the land," the Forest Service is not entitled to a Section 404(f)(1)(A) exemption.

To qualify for the "forest roads" exemption, the Forest Service must assure that road building activities are conducted in accordance with Best Management Practices (BMPs). The agency must establish that the BMPs will "assure that flow and circulation patterns and chemical and biological characteristics of the navigable waters are not impaired, that the reach of the navigable waters is not reduced, and that any adverse effect of the aquatic environment will be otherwise minimized." See 33 U.S.C. § 1344(f)(1)(E). This will be hard to show for Alternative 2, which requires road construction across "the Switchbacks." See DEIS at 2-4. According to the DEIS, this area is at risk to mass failure. At the first steep site, a mass failure could result in a chronic production of sediment into Lost Creek. See DEIS at 3-96.

SEACC- 2

The DEIS claims that "all alternatives will apply Best Management Practices (BMPs) during road construction and timber harvest to ensure the protection of water quality and fisheries." DEIS at 3-27. Absent from the DEIS, however, is any information or analysis showing that the implementation of these BMPs will assure the maintenance or enhancement of flow, circulation, or reach of navigable waters within the project area, including wetlands. In fact, the Forest Service lacks any credible scientific basis for establishing that agency BMPs will accomplish the statutory requirements that would entitle them to this exemption. According to recent agency documents, "[c]urrently, the Tongass NF does not have an approved method to evaluate the effectiveness of BMPs related to impacts of management activities to wetland functions and values." See Tongass National Forest: Annual Monitoring and Evaluation Report for Fiscal Year 1998 at p. 85 (hereinafter USFS FY98). The report goes on to acknowledge that the agency's evaluation of the effectiveness of the standards and guidelines adopted in the revised Tongass Plan for minimizing impacts to wetlands and their associated functions and values is "inconclusive." Id. at 87. Furthermore, agency studies provide documentation of the lack of effectiveness of agency BMPs on every area in the Tongass: Chatham, Stikine, and Ketchikan.¹ The DEIS provides no supporting evidence that the agency will fully and properly apply these BMPs, or that these measures will effectively maintain the flow, circulation, or reach of affected waters, if implemented properly.

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¹ See Riley & Paustian, Fish Passage at Selected Culvert Crossings on the Hoonah Ranger District Road System (Mar. 23, 1999) ("Of the 19 Class II culvert crossings surveyed, 17 were judged to be partial or complete upstream barriers for resident fish species...."). See also USFS FY98 at 22 (Of 107 stream crossings on Class I streams studies on the Petersburg District, 50% of these culverts are assumed not to allow for the successful passage of fish; about 85% of the culverts on Class II streams are assumed inadequate for fish passage.). See also Sea Level Timber Sale FEIS at 3-120 ("Of the [40] streamcrossings requiring fish passage, 19 crossings were identified as failing to provide fish passage.")

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II. THE DEIS FAILS TO ADEQUATELY SHOW THAT ALL ALTERNATIVES WILL COMPLY WITH ALASKA'S ANTIDEGRADATION REGULATION.

The Clean Water Act mandates that each state's water quality standards include an antidegradation policy. See 33 U.S.C. §§ 1313(d)(4)(B), (c)(2)(A); [§§ 303(d)(4)(B), (c)(2)(A)]. The United States Supreme Court has also interpreted the Clean Water Act's mandated state water quality standards to require an antidegradation policy. See PUD v. Washington Dept of Ecology, 511 U.S. 700, 718, 128 L. Ed. 2d 716, 723, 114 S. Ct. 1900 (1994). Alaska's antidegradation policy, 18 AAC 70.015, was approved by the EPA in 1997. See 18 AAC 70.015.

The DEIS states that "[n]one of the alternatives are expected to have significant impacts on watersheds or fisheries." DEIS at 3-32. The DEIS lacks the evidence to back this up, especially in light of the discussion of "the Switchbacks." DEIS at 3-96. How can the agency be sure of insignificant effects on watersheds or fisheries when it states that a mass failure of the proposed road could lead to chronic sediment production into Lost Creek? The DEIS also notes that only one fish stream crossing is planned in any alternative. Why was the choice made to use a culvert instead of a bridge for this stream crossing? Given the lack of adequate road maintenance and problems with fish passage across the Tongass, how can the public be assured that this culvert will not result in blockage to fish passage? To comply with NFMA, the Forest Service must show that its management plans will not adversely affect fish habitat:

"No management practices causing detrimental changes in water temperatures or chemical composition, blockages of water courses or deposits of sediment shall be permitted in these areas which seriously affect water conditions or fish habitat."

36 C.F.R. § 219.27(e)

In order to qualify for a variance from anti-degradation requirements and water quality criteria, the Forest Service must demonstrate that "allowing lower water quality is necessary to accommodate important economic or social development in the area where the water is located" and that "the resulting water quality will be adequate to fully protect existing uses." See 18 AAC 70.015(a)(2)(A)&(C). The DEIS fails to provide sufficient information and analysis to support these required findings.

In all alternatives, reconstruction and re-use of the West Log Dump is allowed. A 1991 SCUBA dive survey discovered bark depth of 0 to 8 cm, with area coverage of 2 to 5 percent, "well within the permit standards for LTFs." DEIS at 3-21. The DEIS fails to provide adequate evidence that damage to the marine environment has not occurred, or that continued use of the LTF will not harm the marine environment. The DEIS also states that "[h]arvest volume from [Alternatives 4, 5, and 6] would be yarded directly to barges along the shoreline." DEIS at 3-22. Since all yarding will be done directly to barges, there seems to be no need for the operator to use the existing LTF. The agency has not shown that allowing lower water quality is necessary to accommodate important economic or social development, not has it shown that the resulting water quality will be adequate to fully protect existing uses, such as commercial fishing and

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subsistence. The Forest Service must provide adequate justification for the continued use of this LTF. Otherwise, the timber sale will violate Alaska's antidegradation policy.

III. THE FOREST SERVICE MUST COMPLY WITH EXECUTIVE ORDER 11990.

Executive Order 11990 prohibits construction in wetlands where practicable alternatives exist and requires that "all practicable measures" be implemented to minimize harm to wetlands. Alternatives 2 and 3 both require construction of roads across wetlands. According to the DEIS, the action alternatives were developed to address the Purpose and Need for the project. Obviously, Alternatives 4, 5, and 6 are practicable alternatives. Since they are practicable alternatives and do not require road construction across wetlands, the Forest Service must choose one of them over Alternatives 2 and 3 to comply with Executive Order 11990.

SEACC-6

The DEIS fails to note whether the construction of a new LTF on the north side of the island in Alternatives 2 and 3 will impact wetlands. Given that the LTF would be constructed in the intertidal zone, we must assume that some wetlands will be affected. The DEIS even states that "[t]ideland fills at LTFs can destroy marine habitats and displace organisms...[t]his LTF is planned for a rich marine environment." DEIS at 3-21. The DEIS states that the area "had robust beds of eelgrass as well as dense stands of kelp" and that "biological diversity was relatively high with many species of aquatic plants and invertebrates including crabs, anemones, and sea cucumbers in abundance." DEIS at 3-21. The Forest Service needs to show the effect of this LTF construction on wetlands, if any. If any wetlands will be affected by the LTF, the Forest Service must choose an alternative which doesn't require a new LTF, since these alternatives are "practicable" and do not require wetland fill for LTF construction.

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IV. THE NORTH SMALL OLD-GROWTH RESERVE BEST MEETS THE REQUIREMENTS OF THE REVISED FOREST PLAN.

According to the DEIS, the small Old-Growth Reserve mapped in TLMP in the project area is approximately 400 acres shy in total size. The DEIS considers two alternatives for a modified reserve which meets the criteria of the Revised Forest Plan. The North Reserve best meets Forest Plan requirements and should be chosen in the Record of Decision for this timber sale.

Appendix K outlines several rules and criteria for the placement of old-growth reserves. All reserves "should be more circular rather than linear in shape to maximize the amount of interior (secure from the effects of forest edge) forest habitat." Forest Plan at K-1. The Revised TLMP Reserve adds nearby islands with extensive shoreline area functioning as forest edge. The North Reserve does a better job at maximizing the amount of interior forest habitat, because it is roughly circular in shape and contains less shoreline. The agency must also "consider site-specific factors in placing reserves to help meet multiple biodiversity or wildlife habitat objectives." *Id.* These include important deer winter range, known or suspected goshawk nesting habitat, known or suspected marbled murrelet nesting habitat. The North Reserve contains all three of these elements while the Revised TLMP Reserve contains only one: important deer winter range. The North Reserve is the location preferred by biologists involved with the project and should be selected in the Record of Decision for this sale.

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V. THE DEIS FAILS TO FOLLOW THE RECOMMENDATIONS OF THE ANADROMOUS FISH HABITAT ASSESSMENT (AFHA) BY CONDUCTING A WATERSHED ANALYSIS.

To compare the effects of various alternatives on watersheds, the DEIS simply lists the amount of logging and road construction in each watershed under each alternative. In comparing impacts, the agency assumes that helicopter yarding will result in less erosion and sedimentation than cable yarding, and that high retention logging prescriptions will result in less erosion and sedimentation. These statements make intuitive sense, but what scientific evidence is there to back up these assumptions? Other than a general sense of which alternatives will have more impact on fisheries and other watershed functions, the effects analysis presented in the DEIS provides very little site-specific analysis of the effects of various alternatives on fisheries and other watershed functions. In order to give decisionmakers and the public a better understanding of the site-specific effects of various alternatives, the agency should complete a cumulative watershed effects analysis, as recommended by AFHA.

The AFHA report concluded that three (3) very important protective measures were needed to ensure fish habitat protection, including “completion of cumulative watershed effects analyses to evaluate natural and human disturbances.” *AFHA Report Synthesis* at 14. The report further elaborated that “[m]ore comprehensive watershed analyses comparable to those in the PACFISH Strategy, if just applied on priority watersheds where timber will be harvested, will provide for both timber harvest and anadromous fish habitat protection.” *Id.* at 15 (emphasis added). This recommendation responded to problems identified recognized by the AFHA team and expert reviewers with the existing project-level planning process, including the failure to:

- thoroughly evaluate potential cumulative watershed effects;
- have sufficient “project-scale inventories for conducting site-specific assessments in sale planning and layout;”
- take a “holistic approach in describing the important watershed functions and processes;”
- take a long-term view of the effect of clearcutting and roading on watershed processes and functions at the landscape scale; and

See AFHA Report, Appendix C, *An Evaluation of the Effectiveness of Current Procedures for Protecting Anadromous Fish Habitat on the Tongass National Forest* 38 (Sept. 1994). These experts concluded that conducting watershed analysis at the front-end of project planning would provide the Forest Service with essential information necessary to adequately protect fish habitat and watershed functions, and updating important resource inventories in a timely manner. *Id.* at 34. The DEIS for this timber sale, however, fails to include a watershed analysis and thus fails to ensure that fish habitat and watershed functions will be protected.

The recommended cumulative watershed effects analyses called for by AFHA would help the Forest Service determine:

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"... how best to manage watersheds with steep unstable slopes, highly productive fisheries, productive timber lands, important and sensitive wildlife resources, high-value recreation and visual resources, cultural resources, and other considerations. ... Watershed analyses would also provide for assessments and management approaches more consistent with site-specific ecological processes and functions, resulting in a systems approach to management."

AFHA Report Synthesis. at 12.

The AFHA Fish Habitat Analysis viewed watershed analysis as playing a critical role in providing the essential information needed for implementing the Revised Tongass Plan at the project level.

"Logging system and transportation plans are the primary foundation for current timber-sale project plans. Current planning is often too narrowly focused on the design of individual harvest units and road segments, so the interdisciplinary team has difficulty addressing broad ecosystem management and cumulative effects issues. Current project planning relies heavily on information from reconnaissance resource inventories. Time and resources needed to validate these reconnaissance inventories and to collect site-specific information are often limited during project planning. The practical opportunities for adjusting unit and road designs during layout, to mitigate problems or concerns missed in planning, are somewhat limited. Watershed analysis provides a mechanism to interject essential information on watershed and fish habitat characteristics into the 'front-end' of project planning, and also provides a structured framework for updating needed resource inventory information in a timely manner."

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APHA, Appendix C, at 38.

VI. THE DEIS USES THE DEER HABITAT CAPABILITY MODEL INCORRECTLY WITHOUT SUFFICIENT JUSTIFICATION.

In the DEIS, the Forest Service uses the deer habitat capability model to determine the effects on deer habitat for each alternative. The deer habitat capability model was developed to determine the effects of clearcutting on deer habitat. In the DEIS, however, the Forest Service uses this model to describe the effects of partial cutting on deer habitat. The agency simply prorates the effect on deer habitat by multiplying the amount of retention in each unit by the difference between an unharvested unit hsi score and a clearcut unit hsi score. The DEIS fails to include any scientific evidence justifying this interpretation. In fact, according to a recent study by the Alaska Department of Fish and Game, some selection logging methods may have the same effect as clearcutting. "When all, or nearly all, of the mature trees in that small area are removed by logging, the stand response is indistinguishable from that of a clearcut." See Kirchhoff, Matthew and Thomson, Simon R.G., Effects of Selective Logging on Deer Habitat in Southeast Alaska: a Retrospective Study, 13 (1998)(attached).

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The DEIS fails to adequately describe the selection logging methods applied under each alternative. Logging units are described by the % retention, but it is unclear what is being

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retained. Does the Forest Service mean % volume retained, % trees retained, or % basal area retained? Each of these lead to completely different results. The Forest Service needs to do a better job describing the logging methods employed by each alternative and estimating the subsequent effects on deer habitat.

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VII. THE DEIS FAILS TO ADEQUATELY SHOW THAT THE KUAKAN TIMBER SALE IS NECESSARY TO MEET MARKET DEMAND FOR TONGASS TIMBER.

According to Appendix E of the DEIS, "timber volume being considered in the Kuakan project Area is ... consistent with ... timber demand estimates by the Pacific Northwest Research Station, Brooks and Haynes, and Kathleen Morse." DEIS at E-13. This statement flies in the face of timber demand estimates provided by Brooks and Haynes, which estimates demand for FY 2000 to be between 96 and 130 mmbf. See Brooks and Haynes, Timber Products Output and Timber Harvests in Alaska: Projections for 1997-2010 (Sept. 1997). As part of a timber sale program which proposes to offer 168 mmbf for sale in FY 2000, the Kuakan DEIS proposes to offer timber in excess of timber demand. The Forest Service must provide a reasoned basis for ignoring the demand estimates of Brooks and Haynes.

According to the largest private timber land owner in Southeast Alaska:

For a variety of reasons, the timber market in which Sealaska sells its timber -- the Pacific Rim market -- remains glutted, even in the absence of the USFS's timber-dumping program. The market is particularly grim for hemlock

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The result is a market that can take no more; indeed, hemlock exports to Japan from North America have already declined by 80% since 1980....

But despite all this, the federal government continues to force-feed the Pacific Rim market with surplus timber.

The inevitable short-term result will be to further depress already eroded timber prices.
....

Letter from Loescher, President and CEO of Sealaska Corp. to The Honorable Ted Stevens (July 12, 1999)(attached).²

The agency's conclusion that more timber from the Tongass is needed now to supply an overly saturated and price-depressed market is simply unreasonable. Instead of preparing and offering below-cost and deficit timber sales from roadless areas, the Forest Service should be

² The Forest Service estimates that hemlock makes up 51% of the species composition in the Kuakan unit pool. The DEIS, however, never discloses the exact species composition of the various alternatives. This lack of information violates NEPA because it prevents the public and decisionmaker from meaningfully evaluating the demand for timber from this project.

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investing its scarce resources in offering small sales to local operators off the existing road system.

VIII. THE DEIS'S ECONOMIC EFFICIENCY ANALYSIS IS INADEQUATE.

As required by the Forest Service Handbook and the Revised Tongass Plan, the Forest Service performed an economic efficiency analysis for all action alternatives. The economic efficiency analysis is inadequate, however, because the agency failed to compare the total economic benefits of the project to the total economic costs. See FSH 2409.18, chapter 30, 32.32. "Economic costs are the sum of the financial costs, non-market costs, and non-Forest Service costs." Id., sec. 32.24. The FSH further defines "direct" economic costs as including "negative impacts on resources that have an economic value." See id., chapter 10, 13.05.

Unfortunately, the Forest Service never quantified the non-market values or calculated the non-market costs resulting from implementing this project on this currently roadless area. The potential negative economic impacts from the approved project on the scenic, wildlife, and wildland values of the project area, including opportunities for wild lands recreation and nature-based and adventure tourism, are simply not taken into account when evaluating the economic efficiency of this project. The Forest Service violated NEPA because the FEIS fails to ensure appropriate consideration of "presently unquantified environmental amenities and values." See 42 U.S.C. § 4332(2)(B). Analysis presented in the DEIS impairs the fair consideration of the adverse environmental and economic effects of this project by the public and decision maker by only evaluating the economic costs and benefits to the timber sale purchaser and agency.

The agency's awareness of its obligation to take into account unquantified environmental amenities and values, such as the non-market value associated with maintaining wild and undeveloped lands, is reflected in the FSH. According to internal agency directive and policy, "[n]on-market outputs are assigned monetary values ... only when excess demand exists for that non-market good." See FSH 2409.18, chap. 30, sec. 32.23, para. 1; sec. 32.24, para 1 ("Non-market costs occur if the project has a detrimental effect on a non-market output and there is excess demand for that output."). The "excess demand" caveat, however, does not excuse the agency's failure to use some method to quantify these non-market values in this project analysis.

SEACC-13

Appendix H - Response to Comments

Letter #15: Marc Wheeler, Southeast Alaska Conservation Council (SEACC)

Conclusion

While SEACC is not convinced that a sale is necessary in this area to satisfy demand for Tongass timber, if the decision to log timber in this project area is made, we urge the Forest Service to select a modified Alternative 5,. Alternative 5 should be modified to protect the viewshed from Thoms Place by deleting Unit 31 and to protect the marine environment by preventing all in-water transfer of logs.

SEACC-14

Thank you for accepting these comments.

Best Regards,



Marc Wheeler
Grassroots Organizer

Forest Service response to Southeast Alaska Conservation Council (SEACC)

SEACC-1 Your comments are noted.

SEACC-2 The U.S. Army Corps of Engineers (COE) has regulatory authority over the discharge of dredged or fill material into waters of the U.S., including wetlands, and is responsible for determinations under Section 404 of the CWA. Section 404(f)(1)(E) of the CWA provides that the construction or maintenance of forest roads for silvicultural activities is exempt from regulation under the Act, provided the roads are constructed and maintained in accordance with the BMPs to ensure that the flow and circulation of navigable waters are not impaired, that their reach is not reduced, and that any adverse effects will be minimized.

The COE provided comments on the Draft EIS for the Kuakan project (see COE letter in this appendix). Part of their comments state: "Road closures clearly demonstrate that roads are being constructed for the sole purpose of timber harvest activities. As such, they would be exempt from regulation under section 404 of the Clean Water act provided the Best Management Practices (BMPs) listed at 33 CFR 323.4(a)(6) are met."

This all becomes a moot point since the Selected Alternative builds no roads.

SEACC-3 The BMPs, and other standards and guidelines identified in TLMP, are monitored to determine if they are being implemented, and if once implemented, they are effective in achieving their goals and objectives (see Monitoring Plan specified in Chapter 6 of TLMP). The results of this monitoring determine whether changes in management direction are necessary. The COE is a participating agency in the Interagency Monitoring and Evaluation Group. This Group identifies the BMPs and other standards and guidelines that are monitored each year, and develops the monitoring protocols. The 1998 Annual Monitoring and Evaluation Report indicates that most of the standards and guidelines for fish, wetland, and soil and water resources are being implemented with little departure. The Report acknowledges that the effectiveness of some of these standards and guidelines has not been determined; however, the Report also indicates that adjusting these standards and guidelines does not appear to be necessary at this time (see 1998 Annual Monitoring and Evaluation Report, pp. 16-25, 58-65, 85-87).

SEACC-4 The Kuakan EIS discusses the potential effects of the proposed timber harvest and road construction on fisheries and watersheds (pp. 3-21 to 3-32). Direct effects of timber harvest on fish streams are avoided, although the EIS acknowledges that road construction, use, and maintenance could introduce sediment into streams. Since the Selected Alternative builds no roads, it will not adversely affect fish habitat.

SEACC-5 Additional information on reconstruction of the Deer Island West LTF is included in the Final EIS, Appendix D - LTF Design. Recent surveys at the site (1997 dive report) indicate bark accumulation in the benthic habitat at this site is minimal (See Fisheries, Watershed and Marine Resources section of the Kuakan EIS). Operation of this LTF is included in the EIS as an option for the timber purchaser as a staging area for helicopter equipment or for use as a log sort yard and rafting area. The Wrangell ADF&G office has no record of any concerns resulting from the initial development and use of the Deer Island West LTF in 1989 (pers. comm. Gordy Woods) from commercial, sport or subsistence users. Based on our available information, we have no reason to believe use of the Deer Island West LTF will result in lower water quality or will affect existing uses. See also the Forest Service response to ADG-4 and ADF&G-11.

Appendix H - Response to Comments

Forest Service response to Southeast Alaska Conservation Council (SEACC)

SEACC-6 We disagree with your rationale that we must chose an all helicopter alternative over a roaded alternative on the premise that it is a "practicable alternative" to roading in wetlands, thus rending any roaded alternative in violation of EO 11990. Never the less, we have Selected Alternative 5 for implementation, which builds no road in wetlands or anywhere else, thus easily complies with EO 11990.

SEACC-7 The North LTF will not be constructed.

SEACC-8 The North Old-growth Reserve is included in the Selected Alternative.

SEACC-9 The Kuakan EIS provides an adequate analysis of potential effects on fisheries and watersheds (pp. 3-21 to 3-32). There could be advantages to conducting more detailed watershed analyses within the project area. However, early in the planning process, we decided that a more detailed watershed analysis was not warranted for the purpose of planning a timber sale on Deer Island. A review of the criteria suggested in Appendix J of the Forest Plan (page J-2) for conducting a more intensive, complex, and field-based watershed analysis supports this decision. Two of the six criteria listed could be considered as applicable to the project area. The topography of the project area does provide potential for erosion (#2) as evidenced by naturally occurring landslides on areas with very steep slopes (#3). However, past slides are relatively small and have not developed into chronic sediment producing areas, and these high hazard areas are not extensive. There are no high-value fish streams on the island (#1). There are no threatened, endangered or sensitive aquatic species known to inhabit the project area (#4). Watershed acres with second growth younger than 30 years amount to far less than 20% in any major watershed (#5) and there are no roads or stream crossings in the project area (#6).

The riparian standards and guidelines are applied as described in the Forest Plan, which meet or exceed all of the recommendations by AFHA. No modifications requiring justification through watershed analysis are being made to these standards and guidelines in the Kuakan Project Area.

SEACC-10 We agree that it is incorrect to assume deer winter range will be maintained in a unit with all or nearly all of the trees removed. Conversely, it is also incorrect to assume that a unit that retains nearly all the trees is equivalent to a clearcut. There are a number of ways to adjust the deer model to reflect retention. Unfortunately, none of these methods have been tested. We chose one strategy and clearly defined our methods in the anticipation of public feedback. After hearing your concerns and talking to ADF&G biologists, we reran the deer model for the FEIS by creating a post-harvest volume layer. Using this strategy we do not change HSI values, but refine the input data (volume) going into the model. Running the model with a post-harvest volume layer results in no change in our analysis for effects on high value habitat (Table Wildlife-2) but slight changes (insignificant) in deer population numbers between the DEIS and FEIS (Table Wildlife-3).

SEACC-11 We have included additional information in the Silviculture section of Chapter 3 in the FEIS to clarify how retention is applied in each unit.

Forest Service response to Southeast Alaska Conservation Council (SEACC)

SEACC-12 We disagree with your interpretation of the Forest Service's obligations under Section 101 of TTRA. Section 101 of the TTRA directs the Forest Service to seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand from such forest, and (2) meets the market demand from such forest for each planning cycle, to the extent consistent with providing for the multiple use and sustained yield of all renewable forest resources and subject to applicable law. Appendix E of the Kuakan EIS provides a discussion of the overall demand for Tongass timber in Southeast Alaska and describes the market demand analysis conducted for the TLMP revision. Chapter 1 of the Kuakan EIS explains how this project relates to TLMP.

SEACC-13 The balance of resource use necessary to maintain a viable economic and social environment is not established at any one level in forest planning. Rather, the process begins with long-range planning at the national level, and continues down through the regional and forest levels to the project planning level. The Kuakan EIS is a project-level analysis. It does, however, implement direction provided at higher levels of planning.

The TLMP EIS includes a comprehensive analysis of the economic and social environment in Southeast Alaska, the Tongass National Forest, and the communities within these areas. The Economic and Social Environment section of the TLMP EIS includes very detailed information on industries directly dependent upon the Forest, including the timber industry and the recreation and tourism industry. This information includes, among other things, 1995 employment data, baseline employment levels projected for the year 2000, and estimated employment and income levels under each alternative considered in the EIS. The TLMP EIS also discusses the potential effects of each alternative on various communities within the Tongass. The EIS concluded that employment in the recreation and tourism industry was expected to increase moderately, and about the same amount, under all alternatives during the first decade, while timber industry employment was expected to decrease under the majority of alternatives, including Alternative 11. The Kuakan project was designed to implement the TLMP, and the EIS prepared for the project tiers to the analysis in the TLMP EIS.

With regards to the Kuakan project specifically, the Forest Service Manual (FSM 1970.6) states, in part, that "the responsible line officer determines the scope, appropriate level, and complexity of economic and social analysis needed." The Kuakan project is a timber sale project, and was proposed to respond to the goals and objectives identified by TLMP for the timber resource and to help move the project area towards the desired future condition identified by TLMP for the lands within the timber production and modified landscape LUDs.

SEACC-14 Alternative 5 as presented in the EIS is the Selected Alternative. Views from Thoms place should be relatively unchanged due to the retention of 65% to 75% of the original stand in unit 31. Regarding in-water transfer of logs, please see the Forest Service response to ADGC-4, ADF&G-11, and SEACC-5.

Appendix H - Response to Comments

Letter #16: Mrs. Billie Smith

BILLIE SMITH
3031 BEAUCHAMP AVENUE
DALLAS, TEXAS 75216

DEAR STEPHEN J. DRAKE & RANDY HOUTER,
I ASK YOU TO BE LEARN & CONSERVE
THE IN THE KUAKAN PROJECT
IN THE TIMBER TO BE CUT AND
TO PROTECT THE WILD LIFE AND
BIRDS AND OTHER HABITAT
SUCH AS FISHING RECREATION AREAS
AND CULTURAL RESOURCES. I ASK
YOU TO CHOOSE ALTERNATIVES THAT
BEST PROTECT THESE AREAS.

THANK YOU
MRS BILLIE
SMITH

BS-1

Forest Service response to Mrs. Billie Smith

BS-1 The Kuakan Project is consistent with the Tongass Land and Resources Management Plan (modified 1999). The Selected Alternative (Alt 5) will provide timber without substantially altering the visual aspects of the project area through use of individual tree harvest methods. Please also see the Forest Service response to JLD-1.

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